15 –ാം കേരള നിയമസഭ

7 –ാം സമ്മേളനം

നക്ഷത്ര ചിഹ്നം ഇല്ലാത്ത ചോദ്യം നം. 1303 **08-12-2022 - ൽ മറുപടിയ്ക്ക്**

പി.ഡബ്ല്യു.ഡി. -4 ആപ്പിന്റെ നിർമ്മാണം

ചോദ്യം		ഉത്തരം	
ശ്രീ. സനീഷ്കുമാർ ജോസഫ്		**ശ്രീ. പി.എ.മുഹമ്മദ് റിയാസ് (പൊതുമരാമത്ത്-വിനോദസഞ്ചാര, യുവജനകാര്യ വകുപ്പ് മന്ത്രി)**	
(എ)	'PWD-4 U' ആപ്പിന്റെ നിർമ്മാണ കരാറിന്റെ പകർപ്പ് ലഭ്യമാക്കാമോ;	(എ)	പൊതുമരാമത്ത് വകുപ്പിന്റെ റോഡ് മെയിന്റനൻസ് മാനേജ്മെന്റ് സിസ്റ്റത്തിന്റെ ഭാഗമായാണ് മൊബൈൽ ആപ്ലിക്കേഷൻ തയ്യാറാക്കിയിരിക്കുന്നത്. ഇത് ഉൾപ്പെട്ട Agreement No. 324/KSTP/PMT/PWD/2020 Dated 05/06/2020 കരാറിന്റെ പകർപ്പ് അനുബന്ധം - I ആയി ചേർക്കുന്നു.
(ബി)	പ്രസ്തുത ആപ്പിന്റെ നിർമ്മാണത്തിനായുള്ള കരാർ കമ്പനിയെ ടെൻഡർ നടപടികളിലൂടെയാണോ തെരെഞ്ഞെടുത്തത് എന്ന് വ്യക്തമാക്കാമോ; അല്ലെങ്കിൽ കാരണം വ്യക്തമാക്കാമോ;	(ബി)	പൊതുമരാമത്ത് വകുപ്പിന്റെ റോഡ് മെയിന്റനൻസ് മാനേജ്മെന്റ് സിസ്റ്റം കരാർ കമ്പനിയെ തിരഞ്ഞെടുത്തത് ലോകബാങ്ക് വ്യവസ്ഥകൾക്ക് വിധേയമായി രാജ്യാന്തര ടെണ്ടർ നടപടിക്രമങ്ങൾ പാലിച്ചാണ്.
(സി)	ആണെങ്കിൽ ടെൻഡറിൽ പങ്കെടുത്ത കമ്പനികളുടെ വിശദാംശവും അവ ക്വോട്ട് ചെയ്ത തുക എത്രയാണെന്ന വിവരവും ലഭ്യമാക്കാമോ?	(സി)	ടെണ്ടറിൽ പങ്കെടുത്ത കമ്പനികളുടെ വിവരങ്ങളും അവർ ക്വാട്ട് ചെയ്ത തുകകളുടെ വിശദാംശങ്ങളും bid Evaluation നുശേഷം ലഭിച്ച സ്കോറുകളുടെ വിശദാംശങ്ങളും അനുബന്ധം - II ആയി ചേർക്കുന്നു.

സെക്ഷൻ ഓഫീസർ

GOVERNMENT OF KERALA
PUBLIC WORKS DEPARTMENTS
KERALA STATE TRANSPORT PROJECT

Agreement No. 324/KSTP/PMT/PWD/2020 dated 05/06/2020

Supply, Installation, Testing and Commissioning of a Web Based Software System for Road Maintenance Management for the Kerala Public Works Department

Client:

The Project Director
Project Management Team
Kerala State Transport Project
Public Works Department
Government of Kerala

Supplier:

M/s TRL Professional & Software Services (India) LLP in JV with Experion Technologies (India) Pvt. Ltd



കേരളം केरल KERALA

C 579962

I. Form of Contract

Agreement No. 324/KSTP/PMT/PWD/2020 dated 05/06/2020

THIS CONTRACT AGREEMENT is made the 5th **day of the month of June 2020**

BETWEEN

the **Project Director, Kerala State Transport Project, TC 11/339, Sree Bala building, Keston road, Kowdiar P.O., Thiruvananthapuram- 695003** for and on behalf of the Governor of Kerala(hereinafter referred to as the "Purchaser" which expression shall include his successors and assignees) of the **one part** and, **M/s TRL Professional & Software Services (India) LLP in JV with Experion Technologies (India) Pvt. Ltd.** (herein after referred to as "the Supplier" which expression shall include their legal heirs, executors, administrators and permitted assignees) of the **other part**.

RL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

406 28-5-2020

alue Rs25000/- issued to Project Director, State Transport Project, PWD



കേരളം केरल KERALA

B 169555

WHEREAS the Purchaser desires to engage the Supplier to supply, install, achieve Operational Acceptance of, and support the following Information System "**Supply, Installation, Testing and Commissioning of a Web Based Software System for Road Maintenance Management for the Kerala Public Works Department**" ("the System"), and the Supplier has agreed to such engagement upon and subject to the terms and conditions appearing below in this Contract Agreement.

NOW IT IS HEREBY AGREED as follows:

Article 1.

Contract Documents

1.1 Contract Documents (Reference GCC Clause 1.1 (a) (ii))

The following documents shall constitute the Contract between the Purchaser and the Supplier, and each shall be read and construed as an integral part of the Contract:

(a) This Contract Agreement and the Appendices attached to the Contract Agreement

(b) Special Conditions of Contract

(c) General Conditions of Contract

(d) Technical Requirements (including Implementation Schedule)

(e) The Supplier's bid and original Price Schedules

(f) Addendum/ queries and clarification

(g) Correspondence with the selected Bidder

FESSIONAL & SOFTWARE
RVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

2

107 Date 28-5-2020

Rs 10000/- issued to Project Director
to State Transport Project (KSTP)

MAY 2020



കേരളം केरल KERALA

B 169556

1.2 Order of Precedence (Reference GCC Clause 2)

In the event of any ambiguity or conflict between the Contract Documents listed above, the order of precedence shall be the order in which the Contract Documents are listed in Article 1.1 (Contract Documents) above, provided that Appendix 7 shall prevail over all provisions of the Contract Agreement and the other Appendices attached to the Contract Agreement and all the other Contract Documents listed in Article 1.1 above.

1.3 Definitions (Reference GCC Clause 1)

Capitalized words and phrases used in this Contract Agreement shall have the same meanings as are ascribed to them in the General Conditions of Contract.

Article 2.

Contract Price and Terms of Payment

2.1 Contract Price (Reference GCC Clause 1.1(a)(viii) and GCC Clause 11)

The Purchaser hereby agrees to pay to the Supplier the Contract Price in consideration of the performance by the Supplier of its obligations under the Contract. The Contract Price shall be **Rupees Four crores fifty four lakhs seventy one thousand three hundred and fifty two only (Rs.4,54,71,352/-)** as specified in the Grand Summary Price Schedule.

Project Director
K.S.T.P., PWD
Trivandrum

RL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

000003

28-5-2020

Date

Rs 10,000/- issued to Project Director, State Transport Project,

MAY 2020



കേരളം केरल KERALA H 445148

The Contract Price shall be understood to reflect the terms and conditions used in the specification of prices in the detailed price schedules, including the terms and conditions of the associated Incoterms, and the taxes, duties and related levies if and as identified.

Article 3. Effective Date for Determining Time for Operational Acceptance

3.1 Effective Date (Reference GCC Clause 1.1 (e) (ix))

The time allowed for supply, installation, and achieving Operational Acceptance of the System shall be determined from the date when all of the following conditions have been fulfilled:

(a) This Contract Agreement has been duly executed for and on behalf of the Purchaser and the Supplier;

(b) The Supplier has submitted to the Purchaser the performance security and the advance payment security, in accordance with GCC Clause 13 2 and GCC Clause 13.3;

(c) The Purchaser has paid the Supplier the advance payment, in accordance with GCC Clause 12;

Each party shall use its best efforts to fulfill the above conditions for which it is responsible as soon as practicable.

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

000004

No. 1409 Date 28-5-2020

Rs 500/- issued to Project Director KSTP

A. SURESH KUMAR
STAMP VENDOR, KARAMANA

27 MAY 2020

3.2 If the conditions listed under 3.1 are not fulfilled within two (2) months from the date of this Contract Agreement because of reasons not attributable to the Supplier, the parties shall discuss and agree on an equitable adjustment to the Contract Price and the Time for Achieving Operational Acceptance and/or other relevant conditions of the Contract.

Article 4.

Appendixes

4.1 The Appendixes listed below shall be deemed to form an integral part of this Contract Agreement.

4.2 Reference in the Contract to any Appendix shall mean the Appendixes listed below and attached to this Contract Agreement, and the Contract shall be read and construed accordingly.

APPENDIXES

Appendix 1.	Supplier's Representative
Appendix 2.	Adjudicator
Appendix 3.	List of Approved Subcontractors
Appendix 4.	Categories of Software
Appendix 5.	Custom Materials
Appendix 6.	Revised Price Schedules (if any)
Appendix 7.	Minutes of Contract Finalization Discussions and Agreed-to Contract Amendments

IN WITNESS WHEREOF the Purchaser and the Supplier have caused this Agreement to be duly executed by their duly authorized representatives the day and year first above written.

For and on behalf of the Purchaser

Signed:

in the capacity of

PROJECT DIRECTOR
Kerala State Transport Project
(For and on behalf of Governor of Kerala)

in the presence of:

1. Smt. Darlene Carmelita D'Cruz, Chief Engineer, KSTP .....

2. Shri. Jayakrishnan M., Executive Engineer, KSTP-PMT .....

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

For and on behalf of the Supplier

Signed:

in the capacity of

M/s TRL Professional & Software Services (India) LLP
in JV with Experion Technologies (India) Pvt. Ltd.
[For and on behalf of the Supplier]

in the presence of :

3. Smt. Darlene Carmelita D'Cruz, Chief Engineer, KSTP .....

4. Shri. Jayakrishnan M., Executive Engineer, KSTP-PMT .....

CONTRACT AGREEMENT

dated the *5th* day of *June, 2020*

BETWEEN

the **Project Director, Kerala State Transport Project, T.C. 11/339, Sree Bala building, Keston road, Kowdiar P.O., Thiruvananthapuram- 695003**,"the Purchaser"

and

M/s TRL Professional & Software Services (India) LLP in JV with Experion Technologies (India) Pvt. Ltd., "the Supplier"

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

Appendix 1. Supplier's Representative

In accordance with GCC Clause 1.1 (b) (iv), the Supplier's Representative is:

Name: Tony Mathew
Principal Transport Specialist
TRL Professional & Software Services (India) LLP
E-277, Greater Kailash-1
New Delhi - 110048

In accordance with GCC Clause 4.3, the Supplier's addresses for notices under the Contract are:

Address of the Supplier's Representative:

Tony Mathew
Principal Transport Specialist
TRL Professional & Software Services (India) LLP
E-277, Greater Kailash-1
New Delhi - 110048

Fallback address of the Supplier:

Binu Jacob
Chief Executive Officer
407, 4th Floor, Thejaswini
Technopark
Thiruvananthapuram - 695581

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

000007

Appendix 2. Adjudicator

In accordance with GCC Clause 1.1 (b) (vi), the agreed-upon Adjudicator is:

Not applicable

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

Appendix 3. List of Approved Subcontractors

The Purchaser has approved use of the following Subcontractors nominated by the Supplier for carrying out the item or component of the System indicated. Where more than one Subcontractor is listed, the Supplier is free to choose between them, but it must notify the Purchaser of its choice sufficiently in advance of the time when the subcontracted work needs to commence to give the Purchaser reasonable time for review. In accordance with GCC Clause 20.1, the Supplier is free to submit proposals for Subcontractors for additional items from time to time. No subcontracts shall be placed with any such Subcontractors for additional items until the Subcontractors have been approved in writing by the Purchaser and their names have been added to this list of Approved Subcontractors, subject to GCC Clause 20.3.

*[specify: **item, approved Subcontractors, and their place of registration that the Supplier proposed in the corresponding attachment to its bid and that the Purchaser approves that the Supplier engage during the performance of the Contract.** Add additional pages as necessary.]*

Item	Approved Subcontractors	Place of Registration
	NIL	

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

Appendix 4. Categories of Software

The following table assigns each item of Software supplied and installed under the Contract to one of the three categories: (i) System Software, (ii) General-Purpose Software, or (iii) Application Software; and to one of the two categories: (i) Standard Software or (ii) Custom Software.

	(select one per item)			(select one per item)	
Software Item	System Software	General-Purpose Software	Application Software	Standard Software	Custom Software
Ubuntu 18.0.4 LTS	✓			✓	
PostgreSQL 12.x		✓		✓	
Apache Tomcat		✓		✓	
GDAL		✓		✓	
Python		✓		✓	
GeoServer		✓		✓	
Flask		✓		✓	
Nginx		✓		✓	

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

Appendix 5. Custom Materials

The follow table specifies the Custom Materials the Supplier will provide under the Contract.

Custom Materials
NIL

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

Appendix 6. Revised Price Schedules

The attached Revised Price Schedules (if any) shall form part of this Contract Agreement and, where differences exist, shall supersede the Price Schedules contained in the Supplier's Bid. These Revised Price Schedules reflect any corrections or adjustments to the Supplier's bid price, pursuant to the ITB Clauses 18.3, 26.2, and 33.1 (ITB Clauses 30.3, 38.2, and 45.1 in the two-stage SBD).

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TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

Appendix 7. Minutes of Contract Finalization Discussions and Agreed-to Contract Amendments

The attached Contract amendments (if any) shall form part of this Contract Agreement and, where differences exist, shall supersede the relevant clauses in the GCC, SCC, Technical Requirements, or other parts of this Contract as defined in GCC Clause 1.1 (a) (ii).

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TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum



കേരളം केरल KERALA

CM 980360

JOINT VENTURE AGREEMENT
BETWEEN
TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP, NEW DELHI
AND
EXPERION TECHNOLOGIES INDIA PRIVATE LIMITED, THIRUVANANTHAPURAM

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

NOTARY
Thengappara
K. RAMACHANDRAN NAIR
BA, LL.B
TVPM Corporation Area in TVPM Dist.
Govt. OF KERALA

05/06/2020

Project Director
K.S.T.P., PWD
Trivandrum

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Dt. 05-06-2020
Experion Technologies India Pvt Ltd
Rs 100/-

000014

29 MAY 2020

SUB TREASURY



केरळം केरल KERALA

CM 980361

JOINT VENTURE AGREEMENT
BETWEEN
TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP, NEW DELHI
AND
EXPERION TECHNOLOGIES INDIA PRIVATE LIMITED, THIRUVANANTHAPURAM

TECHNOPARK TRIVANDRUM

NOTARY
K. RAMACHANDRAN NAIR
OF KERALA

Project Director
K.S.T.P., PWD
Trivandrum

PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Dt.05.06.2020
Expersion Technologies India Pvt Ltd

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SUB TREASURY

JOINT VENTURE AGREEMENT

This Agreement is between:

1. **TRL Professional & Software Services (India) LLP** hereinafter referred to as "**TRL**" or the "**Lead Member**"; and
2. **Experion Technologies India Private Limited,** hereinafter referred to as "**Experion**" or the "**Secondary Partner**".

Each a "Party" or JV Member" and together the "Parties" or "JV Members"

BACKGROUND

Kerala State Transport Project, Government Of Kerala, India (hereinafter referred to as "KSTP") has invited a Request for Proposal ("RfP") for the project "**SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF A WEB BASED SOFTWARE SYSTEM FOR ROAD MAINTENANCE MANAGEMENT FOR THE KERALA PUBLIC WORKS DEPARTMENT**", **reference number KSTP-II- RMMS-01,** hereinafter called the "Project" from the Parties, as a Joint Venture.

THE PARTIES HAVE AGREED THE FOLLOWING:

i) The Parties have agreed to form a Joint Venture, by way of this Agreement, with TRL as the Lead Member and Experion as the Secondary Partner to produce a proposal to KSTP relating to the Project.

ii) TRL, as the Lead Member, shall be in charge of overall administration of any bid or contract related to the Project on behalf of the Joint Venture and shall be the authorised representative of the Joint Venture for conducting all business with KSTP for and on behalf of all JV Members during the bidding process, including signing the online submission of the Joint Venture's proposal, and, subsequently, represent the Joint Venture for and on behalf of all JV Members for all contractual matters and dealings with the KSTP.

iii) Both Parties agree that all work performed by them on producing the Joint Venture's proposal will be performed at their own cost.

iv) If the Joint Venture is unsuccessful and is not awarded a contract by KSTP, this Agreement will be terminated on the date that the notification to that effect is received by the Lead Member and both Parties agree that there will be no outstanding liabilities or obligations between the Parties at termination. Otherwise the Agreement will terminate at the completion of all obligations and liabilities between the Joint Venture and KSTP.

Pangappara
K. RAMACHANDRAN NAIR
BA, LL.B

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Pangappara
K. RA... NAIR BA.LL.B.

03/06/2020

Project Director
K.S.T.P., PWD
Trivandrum

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v) If the Joint Venture is successful in being awarded a contract by KSTP to perform the Project, both Parties undertake to be jointly and severally liable for all the obligations and liabilities relating to the Project in accordance with the Terms of Contract incorporated within the RfP and the details of the scope, timescales and fees in the proposal submitted to KSTP by the Joint Venture.

vi) Both Parties agree that, if a new PLC owned by the two Parties is set up at any time in the future, the Parties will novate the contract awarded by KSTP to the new PLC, subject to the approval of KSTP.

vii) TRL agrees to hold Experion harmless against all and any claims brought by KSTP and/or third parties against Experion relating to the work on the Project, where the claims result from the negligence or default of TRL.

viii) Experion agrees to hold TRL harmless against all and any claims brought by KSTP and/or third parties against TRL relating to the work on the Project, where the claims result from the negligence or default of Experion.

ix) The Parties will take primary and secondary responsibilities for the work involved in each of the tasks required in the Project as described in the Appendix to this Agreement.

x) The laws of India will apply to this Agreement.

Signed for and on behalf of
TRL Professional & Software Services (India) LLP
(Lead Member)

Tony Mathew
Principal Transport Specialist
E-277, Greater Kailash-I
New Delhi – 110048
India

Signed for and on behalf of
Experion Technologies (India) Private Limited
(Secondary Member)

Binu Jacob
Chief Executive Officer
407, 4th Floor, Thejaswini, Technopark
Trivandrum – 695 581, Kerala
India

NOTARY
Passport
K. RAMACHANDRAN NAIR
BA, LL.B
Corporation Area in TVPM
No 06/2010/TVPM
STATE OF KERALA

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Passport
K. R
Opposit
Trivan
05/06/2020
9846016506

Project Director
K.S.T.P., PWD
Trivandrum

Notarised
Person identified by me/ personally appeared before me/
Signed before me/ Attested/ Authenticated*/
*Notary to specify as applicable

Pangappara
K. RAMACHANDRAN NAIR BA.LLB.
Seal of the Notary
Roll No. 730/[illegible]/2010/TVPM
Registration Number of the Notary
Trivandrum [illegible], Mob: 9846016506

Date: 05.06.2020

ATTESTED

Signature:

Name:

Designation:

Address of the Notary:





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TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

APPENDIX: AGREED WORKSHARE BETWEEN TRL & EXPERION[1]

Task No.	Tasks	Primary Responsibility	Secondary Responsibility [2]
1)	Project Management	TRL	
2)	Development of Project Plan	Experion	TRL
3)	Supplying RMMS (iROADS) license for Kerala	TRL	
4)	Review of data collection procedures	TRL	
5)	Provide road asset management domain support/ input	TRL	
6)	Customization & modification of RMMS (iROADS)	Experion	TRL
7)	Software system security audit	Experion	
8)	Hosting of RMMS	Experion	TRL
9)	User acceptance testing of RMMS	Experion	
10)	Development of Mobile App [for public]	Experion	TRL
11)	Hosting of Mobile App [for public]	Experion	
12)	Development of Mobile App [for PWD]	Experion	TRL
13)	Hosting of Mobile App [for PWD]	Experion	
14)	Development of Training Material	Experion	TRL
15)	Training of PWD Engineers [Implementation Period]	Experion	TRL
16)	Train the Trainers [PWD]	Experion	TRL

[1] The works distribution between the consortium partners is on the basis of the ToR issued by the client and our technical proposal.

[2] Secondary responsibility will be generally advisory in nature

05/06/2020

Project Director
K.S.T.P., PWD
Trivandrum

SERVICES (INDIA) LLP

000019

Task No.	Tasks	Primary Responsibility	Secondary Responsibility s
17)	Annual Maintenance & update Support for RMMS & the mobile apps [5 years post the implementation period]	TRL & Experion	
18)	Training during annual maintenance support [5 years post the implementation period]	Experion	TRL
19)	Development of Annual Maintenance Plans [5 years post the implementation period]	Experion	TRL
20)	Annual maintenance support for RMMS & Mobile apps [3 years post the 5 year support]	Experion	TRL

PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

NOTARY
GOVT. OF KERALA

05/06/2020

000020

Project Director
K.S.T.P., PWD
Trivandrum

TRL THE FUTURE OF TRANSPORT

29 May 2020

The Project Director
Kerala State Transport Project (KSTP)
TC11/339, Sreebala Buildings, Keston Road
Thiruvananthapuram, 695 003
Kerala, India

Direct Tel: +44 (0)1344 770409
Fax: +44 (0)1344 770356
Email: pvancampen@trl.co.uk

POWER OF ATTORNEY

RE: SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF A WEB BASED SOFTWARE SYSTEM FOR ROAD MAINTENANCE MANAGEMENT FOR THE KERALA PUBLIC WORKS Bid Ref No : KSTP-II - RMMS -01 ("the Project")

I, Peter Van Campen, Designated Partner of TRL Professional & Software Services (India) LLP, have authorised **Tony Mathew, whose Passport Number is Z4578168,** Principal Transport Specialist of TRL Professional & Software Services (India) LLP, through the PoA dated 09 December 2019, to do the following acts in relation to the Project on behalf of TRL Professional & Software Services (India) LLP:

- sign and submit the technical and commercial proposal;
- sign and submit documentation required to be submitted by partners of an unincorporated joint venture, including a draft and final Joint Venture agreement to be entered into with Experion Technologies India Private Limited and any other documents required to be signed on behalf of TRL Professional & Software Services (India) LLP;
- negotiate with the client including during negotiation meetings; and
- sign and initial the draft and final contract for the above Project

And generally to execute and do such actions which he shall deem necessary or appropriate with the same effect as if I had done, executed or performed such actions myself in relation to the Project.

However, due to the Covid-19 pandemic and restrictions on travel, Tony Mathew, who is living in Delhi, will not be able to travel to Trivandrum and therefore, I have authorised **Binu Jacob, whose Passport Number is Z2784341, Chief Executive Officer of Experion Technologies (India) Private Limited,** to do the following acts in relation to the Project on behalf of TRL Professional & Software Services (India) LLP:

- sign and initial the draft and final contract for the above Project

For the avoidance of doubt, all the rights and liabilities of the parties shall remain as per the contract.

TRL International Limited which has its registered office at Crowthorne House, Nine Mile Ride, Wokingham, Berkshire, RG40 3GA, United Kingdom, is a partner with a 99% capital contribution of TRL Professional & Software Services (India) LLP which is temporarily registered at E – 277, Greater Kailash – I, New Delhi - 110048, India. TRL International Limited is a wholly owned subsidiary of TRL Limited which has its registered office at Crowthorne House, Nine Mile Ride, Wokingham, Berkshire, RG40 3GA, United Kingdom.

NOTARY Pangappara K. RAMACHANDRAN NAIR BA, LL.B TVPM Corporation Area in TVPM Dist. Reg. No 06/2010/TVPM Expiry Date:05-12-2020 GOVT. OF KERALA

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Pangappara K. RAMACHANDRAN NAIR BA.LL.B. NOTARY Roll No. No.06/2010/TVPM Opposite [illegible] Thiyoor Trivandrum-695 035, Mob: 9846016506

TRL Professional & Software Services (India) LLP,
E-277, Greater Kailash-1,
New Delhi,
110 048
India

t: +91 97118 06692
e: enquiries@trl.co.uk
w: www.trl.co.uk

Project Director
K.S.T.P., PWD
Trivandrum

TRL THE FUTURE OF TRANSPORT

This Power of Attorney is effective from 29 May 2020 until 30 June 2020 (unless revoked sooner) whereupon it will terminate and any rights granted will cease.

IN WITNESS HEREOF I, **Peter Van Campen, Designated Partner** of the ABOVE NAMED LLP HAVE EXECUTED THIS POWER OF ATTORNEY ON THIS 29th DAY of May 2020

Peter Van Campen, Designated Partner

For **TRL Professional & Software Services (India) LLP**

BINU JACOB
Passport No. Z-2784341

Notarised
Person identified by me/ personally appeared before me/
Signed before me/ Attested/ Authenticated*/
*Notary to specify as applicable

Seal of the Notary
Registration Number of the Notary

Date:

ATTESTED

Signature:
Name:
Designation:
Address of the Notary:

Pangappara
K. RAMACHAND

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

000022

experion
technologies

CERTIFIED TRUE COPY OF THE RESOLUTION PASSED BY THE BOARD OF DIRECTORS OF EXPERION TECHNOLOGIES (INDIA) PRIVATE LIMITED BY WAY OF CIRCULAR RESOLUTION ON FRIDAY THE 5TH DAY OF JUNE, 2020

Authorizing Mr. Binu Jacob (DIN: 02206317), Managing Director to act on behalf of the Company in relation to "Supply, Installation, Testing and Commissioning of a Web Based Software System for Road Maintenance Management for the Kerala Public Works Bid Ref No.: KSTP-II - RMMS -01" ("the Project")

"RESOLVED THAT consent of the Board of Directors be and is hereby accorded to Mr. Binu Jacob (DIN: 02206317), Managing Director of the Company to sign and execute all contracts, agreements, undertakings, applications, returns, records, receipts, papers etc. in relation to "Supply, Installation, Testing and Commissioning of a Web Based Software System for Road Maintenance Management for the Kerala Public Works Bid Ref No.: KSTP-II - RMMS -01" ("the Project"), for and on behalf of the Company and to do all such acts, matters, deeds and things and to take all steps and to do all things and give such directions as may be required, necessary, expedient or desirable for giving effect to the said project".

\\CERTIFIED TRUE COPY

For and on behalf of the Board of Directors of
EXPERION TECHNOLOGIES (INDIA) PRIVATE LIMITED

Sreekumar Ayyappa Pillai
Director | DIN: 02210608

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

000023

Experion Technologies (India) Pvt. Ltd.
407, 4th Floor, Thejaswini, Technopark
Trivandrum - 695 581, Kerala
www.experionglobal.com

T: +91 471 3047317
F: +91 471 3047314
Email: hr@experionglobal.com
CIN: U72200KL2006PTC019336

experion technologies

TRL THE FUTURE OF TRANSPORT

20 December 2019

The Project Director
Kerala Road Transport Project
TC 11/339, Sree Bala Building
Keston Road,Kowdiar P.O.
Thiruvanantapuram-695003, Kerala

Direct Tel: +91 9711806692
Email:

Contract Ref: KSTP-II/RMMS/01

Project: KSTP-II Supply, Installation, Testing and Commissioning of a Web Based Software System for Road Maintenance Management for the Kerala Public Works Department

Our Ref: TRLP&SS/ KSTP-II/ RMMS/001

Subject: Submission of the originals of Bid Security, Bid Processing Fee and the Power of Attorney

Dear Sir,

We plan to submit the bid for the project KSTP-II/ RMMS/01, as TRL Professional & Software Services (India) LLP in JV with Experion Technologies (India) Private Limited.

In this regard, to comply with various clauses in the bid documents, please find attached the following:

1. Bid Processing Fee (Demand Draft in favour of KSTP Project Director, to the value of Rs. 9,028/-)
2. Bid Security (ICICI Bank Guarantee), to the value of Rs. 750,000/-
3. Power of Attorney
4. JV Agreement between TRL & Experion

We request to acknowledge the receipt of the same. Assuring you the best of our services,

Yours Sincerely,

Tony Mathew

Principal Transport Specialist
TRL Professional & Software Services (India) LLP

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

TRL Professional & Software Services (India) LLP,
E-277, Greater Kailash-1,
New Delhi,
110 048
India

t: +91 97118 06692
e: enquiries@trl.co.uk
w: www.trl.co.uk

000024

JOINT VENTURE AGREEMENT

This Agreement is between:

1. **TRL Professional & Software Services (India) LLP** hereinafter referred to as "TRL" or the **"Lead Member"**; and
2. **Experion Technologies India Private Limited,** hereinafter referred to as **"Experion"** or the **"Secondary Partner".**

Each a "Party" or JV Member" and together the "Parties" or "JV Members"

BACKGROUND

Kerala State Transport Project, Government Of Kerala, India (hereinafter referred to as "KSTP") has invited a Request for Proposal ("RfP") for the project **"SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF A WEB BASED SOFTWARE SYSTEM FOR ROAD MAINTENANCE MANAGEMENT FOR THE KERALA PUBLIC WORKS DEPARTMENT", reference number KSTP-II- RMMS-01,** hereinafter called the "Project" from the Parties, as a Joint Venture.

THE PARTIES HAVE AGREED THE FOLLOWING:

i) The Parties have agreed to form a Joint Venture, by way of this Agreement, with TRL as the Lead Member and Experion as the Secondary Partner to produce a proposal to KSTP relating to the Project.

ii) TRL, as the Lead Member, shall be in charge of overall administration of any bid or contract related to the Project on behalf of the Joint Venture and shall be the authorised representative of the Joint Venture for conducting all business with KSTP for and on behalf of all JV Members during the bidding process, including signing the online submission of the Joint Venture's proposal, and, subsequently, represent the Joint Venture for and on behalf of all JV Members for all contractual matters and dealings with the KSTP.

iii) Both Parties agree that all work performed by them on producing the Joint Venture's proposal will be performed at their own cost.

iv) If the Joint Venture is unsuccessful and is not awarded a contract by KSTP, this Agreement will be terminated on the date that the notification to that effect is received by the Lead Member and both Parties agree that there will be no outstanding liabilities or obligations between the Parties at termination. Otherwise the Agreement will terminate at the completion of all obligations and liabilities between the Joint Venture and KSTP.

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

v) If the Joint Venture is successful in being awarded a contract by KSTP to perform the Project, both Parties undertake to be jointly and severally liable for all the obligations and liabilities relating to the Project in accordance with the Terms of Contract incorporated within the RfP and the details of the scope, timescales and fees in the proposal submitted to KSTP by the Joint Venture.

vi) Both Parties agree that, if a new PLC owned by the two Parties is set up at any time in the future, the Parties will novate the contract awarded by KSTP to the new PLC, subject to the approval of KSTP.

vii) TRL agrees to hold Experion harmless against all and any claims brought by KSTP and/or third parties against Experion relating to the work on the Project, where the claims result from the negligence or default of TRL.

viii) Experion agrees to hold TRL harmless against all and any claims brought by KSTP and/or third parties against TRL relating to the work on the Project, where the claims result from the negligence or default of Experion.

ix) The Parties will take primary and secondary responsibilities for the work involved in each of the tasks required in the Project as described in the Appendix to this Agreement.

x) The laws of India will apply to this Agreement.

Signed for and on behalf of **TRL Professional & Software Services (India) LLP** (Lead Member)	**Tony Mathew** Principal Transport Specialist E-277, Greater Kailash-I New Delhi – 110048 India
Signed for and on behalf of **Experion Technologies (India) Private Limited** (Secondary Member)	**Binu Jacob** Chief Executive Officer 407, 4th Floor, Thejaswini, Technopark Trivandrum – 695 581, Kerala India

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

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Project Director
K.S.T.P., PWD
Trivandrum

APPENDIX: AGREED WORKSHARE BETWEEN TRL & EXPERION[1]

Task No.	Tasks	Primary Responsibility	Secondary Responsibility
	Project Management	TRL	
1	Development of Project Plan	TRL	Experion
2	Supplying RMMS license for Kerala	TRL	
	Review of data collection procedures	TRL	
3	Customization & modification of RMMS	TRL & Experion	
4	Software system security audit	Experion	TRL
5	Hosting of RMMS	Experion	TRL
	User acceptance testing of RMMS	Experion	TRL
1	Development of Mobile App [for public]	Experion	TRL
	Hosting of Mobile App [for public]	Experion	TRL
2	Development of Mobile App [for PWD]	Experion	TRL
3	Hosting of Mobile App [for PWD]	TRL	Experion
4	Development of Training Material	Experion	TRL
5	Training of PWD Engineers [Implementation Period]	Experion	TR
6	Train the Trainers [PWD]	TRL & Experion	
7	Annual Maintenance & update Support for RMMS & the mobile apps [5 years post the implementation period]	TRL Experion	
8	Training during annual maintenance support [5 years post the implementation period]	TRL & Experion	
9	Development of Annual Maintenance Plans [5 years post the implementation period]	Experion	TRL
		TRL	

[1] The works distribution between the consortium partners is on the basis of the ToR issued by the client and our technical proposal.

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

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Project Director
K.S.T.P., PWD
Trivandrum

Task No.	Tasks	Primary Responsibility	Secondary Responsibility
10	Annual maintenance support for RAMS & Mobile apps [3 years post the 5 year support]	TRL & Experion	

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

TRL THE FUTURE OF TRANSPORT

09 December 2019

The Project Director
Kerala State Transport Project (KSTP)
TC11/339, Sreebala Buildings, Keston Road
Thiruvananthapuram, 695 003
Kerala, India

Direct Tel: +44 (0)1344 770409
Fax: +44 (0)1344 770356
Email: pvancampen@trl.co.uk

POWER OF ATTORNEY

RE: SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF A WEB BASED SOFTWARE SYSTEM FOR ROAD MAINTENANCE MANAGEMENT FOR THE KERALA PUBLIC WORKS Bid Ref No : KSTP-II - RMMS -01 ("the Project")

I, Peter Van Campen, Designated Partner of TRL Professional & Software Services (India) LLP, confirm that on behalf of TRL Professional & Software Services (India) LLP, I have authorised **Tony Mathew, whose Passport Number is Z4578168,** Principal Transport Specialist of TRL Professional & Software Services (India) LLP, to do the following acts in relation to the Project on behalf of TRL Professional & Software Services (India) LLP:

- sign and submit the technical and commercial proposal;
- sign and submit documentation required to be submitted by partners of an unincorporated joint venture, including a draft and final Joint Venture agreement to be entered into with Experion Technologies India Private Limited and any other documents required to be signed on behalf of TRL Professional & Software Services (India) LLP;
- negotiate with the client including during negotiation meetings; and
- sign and initial the draft and final contract for the above Project

And generally to execute and do such actions which he shall deem necessary or appropriate with the same effect as if I had done, executed or performed such actions myself in relation to the Project.

TRL International Limited which has its registered office at Crowthorne House, Nine Mile Ride, Wokingham, Berkshire, RG40 3GA, United Kingdom, is a partner with a 99% capital contribution of TRL Professional & Software Services (India) LLP which is temporarily registered at E – 277, Greater Kailash – I, New Delhi - 110048, India. TRL International Limited is a wholly owned subsidiary of TRL Limited which has its registered office at Crowthorne House, Nine Mile Ride, Wokingham, Berkshire, RG40 3GA, United Kingdom.

This Power of Attorney is effective from 14 December 2019 until 13 June 2020 (unless revoked sooner) whereupon it will terminate and any rights granted will cease.

IN WITNESS HEREOF I, **Peter Van Campen, Designated Partner** of the ABOVE NAMED LLP HAVE EXECUTED THIS POWER OF ATTORNEY ON THIS 9th DAY of December 2019

Peter Van Campen, Designated Partner

For **TRL Professional & Software Services (India) LLP**

TRL
Crowthorne House
Nine Mile Ride
Wokingham
RG40 3GA

TRL

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

NOTARY S. SEENA Thiruvananthapuram Dist Regn. No. 6/2017/TVPM Expiry Date 31.12.2022 GOVT. OF KERALA

Project Director
K.S.T.P., PWD
Trivandrum
000029

TRL Professional & Software Services (India) LLP,
E-277, Greater Kailash-1,
New Delhi,
110 048
India

t: +91 97118 06692
e: enquiries@trl.co.uk
w: www.trl.co.uk

TRL THE FUTURE OF TRANSPORT

Tony Mathew

Passport: Z4578168

Notarised

Person identified by me/ personally appeared before me/

Signed before me/ Attested/ Authenticated*/

*Notary to specify as applicable

Authority of certificate issued within the jurisdiction of S.Seema, Thiruvananthapuram Dist. No.....236.....in Page No.....66.....Dated..20.12.2016..of Notarial Register 4/97

/Seal of the Notary

Registration Number of the Notary

Date:

Signature:

Name:

Designation:

Address of the Notary:

S. SEEMA
Notary
Govt. Pleader's Building
Thiruvananthapuram

SPECIAL ADHESIVE
GOVT. OF KERALA

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

000030

E-18193
01/06/2020

experion technologies

TRL THE FUTURE OF TRANSPORT

01 June 2020

Direct Tel: +91 9711806692
Email tmathew@trl.co.uk

The Chief Engineer (Projects)
Kerala Road Transport Project
TC 11/339, Sree Bala Building
Keston Road,Kowdiar P.O.
Thiruvanantapuram-695003, Kerala

Contract Ref:	KSTP-II/RMMS-01
Project:	KSTP-II Supply, Installation, Testing and Commissioning of a Web based Software System for Road Maintenance Management for the Kerala PWD
Our Ref:	TRLP&SS/ KSTP-II/ Kerala RMMS/001
Subject:	Submission of Performance Security & Stamp Paper for Agreement

Dear Ma'am,

This is with reference to your letter ref. KSTP/ 1754/ 2019-AE-6, dated 13/05/2020, regarding awarding of the Kerala RMMS project to us and submission of performance security and non-judicial stamp paper for executing the agreement.

As mentioned in the letter, please find enclosed the following:

- Performance Security for Rs. 28,33,748/- (Twenty Eight Lakhs Thirty Three Thousand Seven Hundred and Forty Eight only)
- Non judicial Stamp Paper (valuing Rs. 45,500/-) for executing the agreement

We thank you for awarding the project to the TRL-Experion Consortium.

We wish to inform that we are ready to sign the contract before 5 June 2020. We request you to intimate us when the draft agreement is ready for our review and signature.

Assuring you the best of our services,

Thanking you,

Yours Sincerely,

Tony Mathew
(Authorised Signatory)

Principal Transport Specialist
TRL Professional & Software Services (India) LLP

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

TRL Professional & Software Services (India) LLP,
E-277, Greater Kailash-1,
New Delhi,
110 048
India

t: +91 97118 06692
e: enquiries@trl.co.uk
w: www.trl.co.uk

HDFC BANK

We understand your world

HDFC BANK LIMITED, BOB
Plaza, T C 12/148 (3)
Pattom, Trivandrum 695 004
KERALA

Date 29-MAY-2020

Form Serial No. GTEE/ 198652

To,
KERALA STATE TRANSPORT PROJECT
(KSTP), PROJECT DIRECTOR,
SREEBALA BUILDINGS, KESTON ROAD,
THIRUVANANTHAPURAM -695 003

OUR REFERENCE	: 020GT02201500002
DATE OF ISSUE	: 29-MAY-2020
APPLICANT	: EXPERION TECHNOLOGIES INDIA PVT LTD
GUARANTEE AMOUNT	: INR 28,33,748.00
AMOUNT IN WORDS	: RUPEES TWENTY EIGHT LAKH THIRTY THREE THOUSAND SEVEN HUNDRED FORTY EIGHT ONLY
EXPIRY DATE	: 30-NOV-2028
EXPIRY PLACE	: TRIVANDRUM
CLAIM DATE	: 30-NOV-2029

DEAR SIR

PLEASE FIND ENCLOSED THE CAPTIONED GUARANTEE DULY ISSUED BY US

THE ORIGINAL GUARANTEE ATTACHED IS TO BE RETURNED TO US ALONG WITH BENEFICIARY DISCHARGE LETTER WITHIN 15 DAYS FROM THE DATE IT CEASES TO BE IN FORCE OR AS SOON AS THE PURPOSE FOR WHICH IT HAS BEEN ISSUED IS FULFILLED ,WHICHEVER IS EARLIER.

WE CONFIRM THAT THE SIGNATORIES WHO HAVE SIGNED THE SUBJECT GUARANTEE / EXTENSION AS STATED BELOW HAVE THE REQUISITE POWERS TO SIGN ON BEHALF OF THE BANK.

1. Mr./Ms.	MR. REJU ARAVIND	2. Mr./Ms.	MRS S SREEVIDYA
Designation	SENIOR MANAGER	Designation	SENIOR MANAGER

FURTHER CONFIRMATION OF THIS GUARANTEE IF DESIRED, SHOULD BE OBTAINED FROM THE ABOVE MENTIONED BRANCH.

THIS LETTER FORMS AN INTEGRAL PART OF THE GUARANTEE.

FOR HDFC BANK LTD.

AUTHORISED SIGNATORY/S

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

000032

Project Director
K.S.T.P., PWD
Trivandrum



കേരളം केरल KERALA

CR 605168

Bank Guarantee Number : 020GT02201500002
Bank Guarantee Date : 29-MAY-2020

THIS NON-JUDICIAL STAMP PAPER FORMS PART AND PARCEL OF THE BANK GUARANTEE NO: 020GT02201500002, DATED 29-MAY-2020, ISSUED IN FAVOR OF KERALA STATE TRANSPORT PROJECT (KSTP), PROJECT DIRECTOR, SREEBALA BUILDINGS, KESTON ROAD,THIRUVANANTHAPURAM -695 003 ISSUED ON BEHALF OF M/S EXPERION TECHNOLOGIES INDIA PVT LTD

FOR HDFC BANK LTD.
Authorised Signatory

FOR HDFC BANK LTD.
Authorised Signatory

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

000033

12.5.20

403
21/5/2020
Rs 100/-only
Experion Technologies
India Pvt Ltd



കേരളം केरल KERALA

Bank Guarantee Number : 020GT02201500002
Bank Guarantee Date : 29-MAY-2020

THIS NON-JUDICIAL STAMP PAPER FORMS PART AND PARCEL OF THE BANK GUARANTEE NO: 020GT02201500002, DATED 29-MAY-2020, ISSUED IN FAVOR OF KERALA STATE TRANSPORT PROJECT (KSTP), PROJECT DIRECTOR, SREEBALA BUILDINGS, KESTON ROAD,THIRUVANANTHAPURAM -695 008 ISSUED ON BEHALF OF M/S EXPERION TECHNOLOGIES INDIA PVT LTD

FOR HDFC BANK LTD.
Authorised Signatory

Authorised Signatory

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

000034

12.5.20

PERFORMANCE BANK GUARANTEE

Bank Guarantee Number : 020GT02201500002
Bank Guarantee Date : 29-MAY-2020

To

The Project Director,
Kerala State Transport Project (KSTP),
Sreebala Buildings,
Keston Road, Thiruvananthapuram – 695 003

We have been informed that on 13 May 2020, you awarded Contract No. [KSTP-II -RMMS-01] for [KSTP-II Supply, Installation, Testing and Commissioning of a Web based Software System for Road Maintenance Management for the Kerala PWD (hereinafter called "the Contract") to [TRL Professional & Software Services (India) LLP in JV with Experion Technologies (India) Private Limited] (hereinafter called "the Supplier"). Furthermore, we understand that, according to the conditions of the Contract, a performance guarantee is required.

At the request of the Supplier, we HDFC Bank Limited a banking company incorporated under the Companies Act, 1956 having its Registered office at HDFC Bank House, C.S. No. 6/242, Senapati Bapat Marg, Lower Parel (W), Mumbai 400013 and amongst other places branch at HDFC Bank Ltd, WBO, 2nd Floor, BOB Plaza, Pattom, Trivandrum, Kerala -695 004 hereby irrevocably undertake to pay you any sum(s) not exceeding [Rs.28,33,748/-, Rupees Twenty Eight Lakhs Thirty Three Thousand Seven Hundred and Forty Eight only] upon receipt by us of your first demand in writing declaring the Supplier to be in default under the Contract, without cavil or argument, or your needing to prove or to show grounds or reasons for your demand or the sum specified therein. On the date of your issuing, to the Supplier, the Operational Acceptance Certificate for the System, the value of this guarantee will be reduced to any sum(s) not exceeding [Rs.17,71,093/-, Rupees Seventeen Lakhs Seventy One Thousand and Ninety Three only]. This remaining guarantee shall expire not later than 96 months from the date of the Operational Acceptance Certificate for the System and any demand for payment under it must be received by us at this office on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 758 except that subparagraph (ii) of Sub-article 20 (a) is hereby excluded.

FOR HDFC BANK LTD.

Authorised Signatory

FOR HDFC BANK LTD.

Authorised Signatory

000035

Project Director
K.S.T.P., PWD
Trivandrum

L PROFESSIONAL & SOFTWARE
SERVICES (INDIA) LLP

Bank Guarantee Number : 020GT02201500002
Bank Guarantee Date : 29-MAY-2020

"Notwithstanding anything contained herein: Our liability under this Guarantee shall not exceed Rs. [Rs.28,33,748/-, Rupees Twenty Eight Lakhs Thirty Three Thousand Seven Hundred and Forty Eight only]. This Guarantee shall be valid upto 30-NOV-2028 and we are liable to pay the guaranteed amount or any part thereof under this guarantee only and only if you serve upon us a written claim or demand in terms of the guarantee on or before 30-NOV-2029 failing which the Bank shall stand released and discharged from any liability whatsoever under this Guarantee.

All claims under this guarantee will be made payable at HDFC Bank Ltd, WBO, 2nd Floor, BOB Plaza, Pattom, Trivandrum, Kerala -695 004.

This guarantee will be returned to the Bank once the purpose of issuance has been fulfilled, or upon its expiry, whichever is earlier.

The BG Confirmation Letter No: GTEE/198652 is an integral Part of the BG No:020GT02201500002, Dated: 29-MAY-2020

For HDFC Bank Ltd ,

1. Mr./Ms. MR. REJU ARAVIND
Designation SENIOR MANAGER

2. Mr./Ms MRS. S SREEVIDYA
Designation SENIOR MANAGER

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

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(b) SPECIAL CONDITIONS OF CONTRACT (SCC)

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

Table of Clauses

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4. Notices (GCC Clause 4)
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6. Settlement of Disputes (GCC Clause 6)

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TRL PROFESSIONAL & SOLUTIONS SERVICES (INDIA) LLP

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Project Director
K.S.T.P., PWD
Trivandrum

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TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

Special Conditions of Contract

The following Special Conditions of Contract (SCC) shall supplement or amend the General Conditions of Contract (GCC). Whenever there is a conflict, the provisions of the SCC shall prevail over those in the General Conditions of Contract. For the purposes of clarity, any referenced GCC clause numbers are indicated in the left column of the SCC.

A. CONTRACT AND INTERPRETATION

1. Definitions (GCC Clause 1)

GCC 1.1 (a) (ix)	The applicable edition of the Procurement Guidelines is dated: *January2011*
GCC 1.1 (b) (i)	The Purchaser is: *The Project Director, KSTP*
GCC 1.1 (b) (ii)	The Project Manager is: *The Chief Engineer(Administration), PWD*
GCC 1.1 (e) (i)	The Purchaser's Country is: *India*
GCC 1.1 (e) (iii)	The Project Site(s) is/are:
GCC 1.1 (e) (x)	***The Contract shall continue in force until the Information System and all the Services have been provided unless the Contract is terminated earlier***
GCC 1.1 (e) (xii)	The Post-Warranty Services Period is *36 months* starting with the completion of the Warranty Period.

2. Contract Documents (GCC Clause 2)

GCC 2	***There are no Special Conditions of Contract applicable to GCC Clause 2.***

3. Interpretation (GCC Clause 3)

GCC 3.1.1	The Contract's governing language is ***English***

4. Notices (GCC Clause 4)

GCC 4.3	Address of the Project Manager: *Chief Engineer, NH & Administration, Public Works Department, Museum P.O., Thiruvananthapuram-33*

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	Fallback address of the Purchaser: *Executive Engineer, e-Governance Cell, O/o the Chief Engineer, NH & Administration, Public Works Department, Museum P.O., Thiruvananthapuram-33*

5. Governing Law (GCC Clause 5)

GCC 5.1	The Contract shall be interpreted in accordance with the laws of: *India*

6. Settlement of Disputes (GCC Clause 6)

GCC 6.1.4	The Appointing Authority for the Adjudicator is: ***President, Indian roads congress (IRC)***
GCC 6.2.3	*If the Supplier is foreign (including a Joint Venture when at least one partner is foreign), the Contract shall contain the following provision:* Arbitration proceedings shall be conducted in accordance with the rules of arbitration of *UNCITRAL*. These rules, in the version in force at the time of the request for arbitration, will be deemed to form part of this Contract. *If the Supplier is a national of the Purchaser's country, the Contract shall contain the following provision:* Any dispute between the Purchaser and a Supplier arising in connection with the present Contract shall be referred to arbitration in accordance with the laws of the Purchaser's country.

B. Subject Matter of Contract

7. Scope of the System (GCC Clause 7)

GCC 7.3	The Supplier's obligations under the Contract will include the following recurrent cost items, as identified in the Recurrent Cost tables in the Supplier's Bid:As per scope of supplies & supports in section VI – Technical requirements The Supplier agrees to supply spare parts required for the operation and maintenance of the System, as stated below, for the *eight years* beginning with Operational Acceptance. Moreover, the price of such spare parts shall be those specified in the spare parts price schedule submitted by the Supplier as part of its bid. These prices shall include the purchase price for such spare parts and other costs and expenses (including the Supplier's fees) relating to the supply of spare parts.

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8. Time for Commencement and Operational Acceptance (GCC Clause 8)

GCC 8.1	The Supplier shall commence work on the System within: *15* days from the Effective Date of the Contract.
GCC 8.2	Operational Acceptance will occur on or before: ***Operational Acceptance date consistent with the Implementation Schedule in the Technical Requirements Section***

9. Supplier's Responsibilities (GCC Clause 9)

GCC 9.9	The Supplier shall have the following additional responsibilities: *install, customize, host and maintain the systems under this contract*

10. Purchaser's Responsibilities (GCC Clause 10)

GCC 10.12	The Purchaser shall have the following additional responsibilities: none

C. PAYMENT

11. Contract Price (GCC Clause 11)

GCC 11.2 (b)	Adjustments to the Contract Price shall be as follows: *None*

12. Terms of Payment (GCC Clause 12)

GCC 12.1

Subject to the provisions of GCC Clause 12 (Terms of Payment), the Purchaser shall pay the Contract Price to the Supplier according to the categories and in the manner specified below. Only the categories Advance Payment and Complete System Integration relate to the entire Contract Price. In other payment categories, the term "total Contract Price" means the total cost of goods or services under the specific payment category. Within each such category, the Contract Implementation Schedule may trigger pro-rata payments for the portion of the total Contract Price for the category corresponding to the goods or services actually Delivered, Installed, or Operationally Accepted, at unit prices and in the currencies specified in the Price Schedules of the Contract Agreement.

Sl.No	Deliverable	Timeline(from commencement of service)	Payment (% of total accepted amount)
1	Submission and approval of Inception report with System Architecture/ Design Report (all the modules and	Within 20 days	5 %

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		components) and acceptance testing plan		
	2	Modification of the software systems as per the approved acceptance testing report , delivery of the software systems complete with all third party software and licenses, installation and hosting in the staging arrangement of SDC or other approved locations	Within four months	18 %
	3	Completion of compliance testing and approval of reports with production of security audit certificates and hosting in live or production environment so that the entire system with mobile app for public and field data collection apps is ready for usage Submission of final source codes of RIs & RMMS system and field apps	Within five months	35%
	4	Submission of training and audio & video training materials, Programmers and User Manual (it should include details about Database, Programming File Details and Various Compiled component), Configuration and Customization User Manual, Configuration and Customization Administrator Manual , Procedure Manual to integrate external application etc with completion of first round of user trainings	Within six months	8%
	5	Annual Maintenance plan and report and its approval during support period of 5 years	By end of every year of next five years	@ 5% for each year for five years
	6	Successful delivery of services & supports in keeping the whole system workable during extended service period of 3 years.	By end of every year of the next three years	@ 3% for each year for three years

GCC 12.3	The Purchaser shall pay to the Supplier interest on the delayed payments at a rate of: ***6% PER ANNUM.***
GCC 12.4	For Goods and Services supplied locally, the Purchaser will pay the Supplier in ***the currency stated in the Contract Agreement and the Price Schedules it refers to***
GCC 12.5	Payment for Goods supplied from outside the Purchaser's Country shall be in the form of: ***an irrevocable letter of credit***

13. Securities (GCC Clause 13)

GCC 13.2.1	The Supplier shall provide within twenty-eight (28) days of the notification of Contract award an Advance Payment Security in the amount and currency of the Advance Payment specified in SCC for GCC Clause 12.1 above.
GCC 13.2.2	The reduction in value and expiration of the Advance Payment Security are calculated as follows: *Not applicable since no advance*

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	shall be given
GCC 13.3.1	The Performance Security shall be denominated in *INR*for an amount equal to *8*percent of the Contract Price, excluding any Recurrent Costs.
GCC 13.3.4	During the Warranty Period (i.e., after Operational Acceptance of the System), the Performance Security shall be reduced to *5*percent of the Contract Price, excluding any Recurrent Costs. This may further be reduced to 2.5 percent of the contract price, excluding any recurrent costs, during post warranty service period to cover up remaining obligations of the supplier.

14. Taxes and Duties (GCC Clause 14)

GCC 14	***There are no Special Conditions of Contract applicable to GCC Clause 14***

D. INTELLECTUAL PROPERTY

15. Copyright (GCC Clause 15)

GCC 15.3	The Purchaser may assign, license, or otherwise voluntarily transfer its contractual rights to use the Standard Software or elements of the Standard Software, without the Supplier's prior written consent, under the following circumstances: Any time
GCC 15.4	The Purchaser's and Supplier's rights and obligations with respect to Custom Software or elements of the Custom Software are as follows Supplier: *shall ensure to maintain all the custom software or elements licensed and working without any interruption use by the client.* The Purchaser's and Supplier's rights and obligations with respect to Custom Materials or elements of the Custom Materials are as follows Supplier : *shall ensure to maintain all the custom software or elements licensed and working without any interruption use by the client.* The Supplier's rights in relation to the Custom Software may: • Be limited to use in order to support the Purchaser; or • Extend to commercial exploitation by re-licensing to third-party customers. If the Supplier's rights extend to commercial exploitation, they may be limited as follows: • There may be an interim period, designed to protect the

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Purchaser's competitive edge, during which the Supplier is not permitted to exploit commercially; and/or

- The Supplier may be prohibited from licensing the Custom Software to certain categories of customer (for example, direct competitors of the Purchaser) or in certain territories (for example, the Purchaser's Country), either for a limited period or indefinitely; and/or

- The Supplier may be required to pay royalties to the Purchaser when it licenses third parties to use the Custom Software.

The first two of these categories of limitation are intended to protect the Purchaser's competitive edge. The third is intended to allow the Purchaser to share in future profits made by the Supplier through exploitation of the Custom Software. Royalty arrangements will have to be backed up by obligations to report to the Purchaser regarding future sales of products to which royalties apply and audit rights so that the Purchaser can check that the Supplier's reports are accurate. Clearly, if royalty arrangements are put in place, the value of the Custom Software to the Supplier is reduced, so the Purchaser may not benefit from an up-front cost saving.

The Purchaser's rights in relation to the Custom Software may also be restricted to "user" rights or extended to commercial exploitation. If the Purchaser is to be treated as a mere user of the Custom Software, it might accept restrictions on use similar to those imposed in relation to the Standard Software (indeed, the default position in the GCC is that the Custom Software will be licensed to the Purchaser on exactly the same terms as the Standard Software if the Intellectual Property Rights in the Custom Software does not vest in the Purchaser). It may, however, also expect to have access to, and a right to use, CASE files and Source Code to the Custom Software (whereas, at best, Source Code to the Standard Software is likely to be deposited in escrow).

If the Purchaser is to be permitted to exploit the Custom Software commercially, its exploitation rights may be limited in similar ways to the ways in which the Purchaser's own usage rights to the Custom Software may be limited.

It may be appropriate to apply different arrangements to various elements of the Custom Software, according to their commercial sensitivity and potential for exploitation and the degree of competitive advantage that they afford to the Purchaser.

The various possible arrangements can be achieved by a variety of contractual mechanisms. Ownership of Intellectual Property Rights in the Custom Software may vest the Supplier or the Purchaser, with the owner of those rights granting an appropriate license to the other party. This license may be subject to various degrees of exclusivity, depending on the desired commercial outcome (for example, the Supplier may own the Intellectual Property Rights in the Custom Software by granting to the Purchaser a license that is exclusive, in relation to exploitation in

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	the Purchaser's Country, for two years). If an exclusive license is to be granted, competition law issues will need to be considered in some jurisdictions. Each is sufficiently different as to render virtually all sample text inappropriate in numerous cases. Accordingly, the Purchaser of Custom Software will, in most instances, require the services of an appropriately skilled lawyer to draft SCC for the rights and obligations regarding Custom Software (more particularly, the variety of rights and obligations that potentially apply to different items of Custom Software).
GCC 15.5	***"No software escrow contract is required for the execution of the Contract;"***

16. Software License Agreements (GCC Clause 16)

GCC 16.1 (a) (iii)	The Standard Software license shall be valid ***throughout the territory of the Purchaser's Country***
GCC 16.1 (a) (iv)	Use of the software shall be subject to the following additional restrictions *none*
GCC 16.1 (b) (ii)	The Software license shall permit the Software to be used or copied for use or transferred to a replacement computer ***provided the replacement computer falls within approximately the same class of machine and maintains approximately the same number of users, if a multi-user machine***
GCC 16.1 (b) (vi)	The Software license shall permit the Software to be disclosed to and reproduced for use (including a valid sublicense) by ***support service suppliers or their subcontractors, exclusively for such suppliers or subcontractors in the performance of their support service contracts*** subject to the same restrictions set forth in this Contract.

17. Confidential Information (GCC Clause 17)

GCC 17.1	***There are no modifications to the confidentiality terms expressed in GCC Clause 17.1***
GCC 17.7	The provisions of this GCC Clause 17 shall survive the termination, for whatever reason, of the Contract for ***the period specified in the GCC***

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E. Supply, Installation, Testing, Commissioning, and Acceptance of the System

18. Representatives (GCC Clause 18)

GCC 18.1	The Purchaser's Project Manager shall have the following additional powers and / or limitations to his or her authority to represent the Purchaser in matters relating to the Contract ***no additional powers or limitations***
GCC 18.2.2	The Supplier's Representative shall have the following additional powers and / or limitations to his or her authority to represent the Supplier in matters relating to the Contract ***no additional powers or limitations***

19. Project Plan (GCC Clause 19)

GCC 19.1	Chapters in the Project Plan shall address the following subject: *(a) Project Organization and Management Plan;* *(b) Delivery and Installation Plan* *(c) Training Plan* *(d) Pre-commissioning and Operational Acceptance Testing Plan* *(e) Warranty Service Plan* *(f) Task, Time, and Resource Schedules* *(g) Post-Warranty Service Plan* *(h) Technical Support Plan* ***Further details regarding the required contents of each of the above chapters are contained in the Technical Requirements, Section***
GCC 19.2	Within *fifteen (15)]* days from the Effective Date of the Contract, the Supplier shall present a Project Plan to the Purchaser. The Purchaser shall, within, ***fourteen (14)]***days of receipt of the Project Plan, notify the Supplier of any respects in which it considers that the Project Plan does not adequately ensure that the proposed program of work, proposed methods, and/or proposed Information Technologies will satisfy the Technical Requirements and/or the SCC (in this Clause 19.2 called "non-conformities" below). The Supplier shall, within ***five (5)***days of receipt of such notification, correct the Project Plan and resubmit to the Purchaser. The Purchaser shall, within *five (5)* days of resubmission of the Project Plan, notify the Supplier of any remaining non-conformities. This procedure shall be repeated as

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	necessary until the Project Plan is free from non-conformities. When the Project Plan is free from non-conformities, the Purchaser shall provide confirmation in writing to the Supplier. This approved Project Plan ("the Agreed and Finalized Project Plan") shall be contractually binding on the Purchaser and the Supplier.
GCC 19.5	The Supplier shall submit to the Purchaser the following reports: ***(a) Monthly (Quarterly) progress reports, summarizing:*** ***(i) results accomplished during the prior period;*** ***(ii) cumulative deviations to date from schedule of progress milestones as specified in the Agreed and Finalized Project Plan;*** ***(iii) corrective actions to be taken to return to planned schedule of progress; proposed revisions to planned schedule;*** ***(iv) other issues and outstanding problems; proposed actions to be taken;*** ***(v) resources that the Supplier expects to be provided by the Purchaser and/or actions to be taken by the Purchaser in the next reporting period;*** ***(vi) other issues or potential problems the Supplier foresees that could impact on project progress and/or effectiveness.*** *(b)* Other reports may be needed to monitor Contract performance/progress with System implementation, like ***(*) inspection and quality assurance reports*** ***(*) training participants test results*** ***(*) monthly log of service calls and problem resolutions***

20. Subcontracting (GCC Clause 20)

GCC 20	***There are no Special Conditions of Contract applicable to GCC Clause 20."***

21. Design and Engineering (GCC Clause 21)

GCC 21.2	The Contract shall be executed in accordance with the edition or the revised version of all referenced codes and standards current at the date ***as specified in the GCC***
GCC 21.3.1	The Supplier shall prepare and furnish to the Project Manager the

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	following documents for which the Supplier must obtain the Project Manager's approval before proceeding with work on the System or any Subsystem covered by the documents. *none*

22. Procurement, Delivery, and Transport (GCC Clause 22)

GCC 22.4.3	The Supplier *shall* be free to use transportation through carriers registered in any eligible country *shall not* obtain insurance from any eligible source country.
GCC 22.5	The Supplier shall provide the Purchaser with shipping and other documents ***as specified in the GCC***

23. Product Upgrades (GCC Clause 23)

GCC 23.4	The Supplier shall provide the Purchaser: ***with all new versions, releases, and updates to all Standard Software during the Warranty Period, for free, as specified in the GCC***

24. Implementation, Installation, and Other Services (GCC Clause 24)

GCC 24	*There are no Special Conditions of Contract applicable to GCC Clause 24*

25. Inspections and Tests (GCC Clause 25)

GCC 25	*There are no Special Conditions of Contract applicable to GCC Clause 25*

26. Installation of the System (GCC Clause 26)

GCC 26	*There are no Special Conditions of Contract applicable to GCC Clause 26*

27. Commissioning and Operational Acceptance (GCC Clause 27)

GCC 27.2.1	Operational Acceptance Testing shall be conducted in accordance with *provisions in the technical specifications*
GCC 27.2.2	If the Operational Acceptance Test of the System, or Subsystem(s), cannot be successfully completed within ***no more than ninety (90)*** days from the date of Installation or any other period agreed upon by the Purchaser and the Supplier, then GCC Clause 27.3.5 (a) or (b) shall apply, as the circumstances may

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	dictate.

F. GUARANTEES AND LIABILITIES

28. Operational Acceptance Time Guarantee (GCC Clause 28)

GCC 28.2	Liquidated damages shall be assessed at *0.1* percent per week. The maximum liquidated damages are *10*percent of the Contract Price, or relevant part of the Contract Price if the liquidated damages apply to a Subsystem.
GCC 28.3	Liquidated damages shall be assessed ***with respect to the delivery and payment schedule***

29. Defect Liability (GCC Clause 29)

GCC 29.1	For Software, exceptions or limitations to the Supplier's warranty obligations shall be as follows: *The supplier shall take all measures to make the whole system workable during the warranty and extended service period.*
GCC 29.3 (iii)	The Supplier warrants that the following items have been released to the market for the following specific minimum time periods: ***All Standard Software and technologies used directly and indirectly for this contract must have been commercially available in the market for at least three months.***
GCC 29.4	The Warranty Period (N) shall begin from the date of Operational Acceptance of the System or Subsystem and extend for *five years with an additional service period of three years.*
GCC 29.10	During the Warranty Period, the Supplier must commence the work necessary to remedy defects or damage within *3(working) days* / of notification.

30. Functional Guarantees (GCC Clause 30)

GCC 30	***There are no Special Conditions of Contract applicable to GCC Clause 30***

31. Intellectual Property Rights Warranty (GCC Clause 31)

GCC 31	***There are no Special Conditions of Contract applicable to GCC Clause 31***

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32. Intellectual Property Rights Indemnity (GCC Clause 32)

GCC 32	*There are no Special Conditions of Contract applicable to GCC Clause 32.*

33. Limitation of Liability (GCC Clause 33)

GCC 33	*There are no Special Conditions of Contract applicable to GCC Clause 33*

G. RISK DISTRIBUTION

34. Transfer of Ownership (GCC Clause 34)

GCC 34	*There are no Special Conditions of Contract applicable to GCC Clause 34*

35. Care of the System (GCC Clause 35)

GCC 35	*There are no Special Conditions of Contract applicable to GCC Clause 35*

36. Loss of or Damage to Property; Accident or Injury to Workers; Indemnification (GCC Clause 36)

GCC 36	*There are no Special Conditions of Contract applicable to GCC Clause 35*

37. Insurances (GCC Clause 37)

GCC 37.1 (c)	The Supplier shall obtain Third-Party Liability Insurance in the amount of *INR 40 millions,* with deductible limits of no more than *"as per regulations in the purchaser country"*. The insured Parties shall be all ***parties** likely to be suffered from the use of supplies*. The Insurance shall cover the period from *the **Effective Date of the Contract*** until ***expiration date of the Contract or its completion***
GCC 37.1 (e)	The Supplier shall obtain Worker's Compensation Insurance in accordance with the statutory requirements of *India.* The Insurance shall cover the period from ***beginning date, relative to the Effective Date of the Contract*** until ***expiration date, relative to the Effective Date of the Contract or its completion*** . The Supplier shall obtain Employer's Liability Insurance in accordance with the statutory requirements of *India. And* As p

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	r***equirements*** *& regulations in the purchaser country.* The Insurance shall cover the period from *the **Effective Date of the Contract*** until ***expiration date of the Contract or its completion.***

38. Force Majeure (GCC Clause 38)

GCC 38	***There are no Special Conditions of Contract applicable to GCC Clause 38.***

H. CHANGE IN CONTRACT ELEMENTS

39. Changes to the System (GCC Clause 39)

GCC 39	***There are no Special Conditions of Contract applicable to GCC Clause 39***

40. Extension of Time for Achieving Operational Acceptance (GCC Clause 40)

GCC 40	*There are no Special Conditions of Contract applicable to GCC Clause 40*

41. Termination (GCC Clause 41)

GCC 41	***There are no Special Conditions of Contract applicable to GCC Clause 41***

42. Assignment (GCC Clause 42)

GCC 42	***There are no Special Conditions of Contract applicable to GCC Clause 42***

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(a) GENERAL CONDITIONS OF CONTRACT

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General Conditions of Contract

A. CONTRACT AND INTERPRETATION

1. Definitions

1.1 In this Contract, the following terms shall be interpreted as indicated below.

(a) contract elements

(i) "Contract" means the Contract Agreement entered into between the Purchaser and the Supplier, together with the Contract Documents referred to therein. The Contract Agreement and the Contract Documents shall constitute the Contract, and the term "the Contract" shall in all such documents be construed accordingly.

(ii) "Contract Documents" means the documents specified in Article 1.1 (Contract Documents) of the Contract Agreement (including any amendments to these Documents).

(iii) "Contract Agreement" means the agreement entered into between the Purchaser and the Supplier using the form of Contract Agreement contained in the Sample Forms Section of the Bidding Documents and any modifications to this form agreed to by the Purchaser and the Supplier. The date of the Contract Agreement shall be recorded in the signed form.

(iv) "GCC" means the General Conditions of Contract.

(v) "SCC" means the Special Conditions of Contract.

(vi) "Technical Requirements" means the Technical Requirements Section of the Bidding Documents.

(vii) "Implementation Schedule" means the Implementation Schedule Sub-section of the Technical Requirements.

viii) "Contract Price" means the price or prices defined in Article 2 (Contract Price and Terms of Payment) of the Contract Agreement.

(ix) "Procurement Guidelines" refers to the edition **specified in the SCC** of the World Bank Guidelines: Procurement under IBRD Loans and

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IDA Credits.

(x) "Bidding Documents" refers to the collection of documents issued by the Purchaser to instruct and inform potential suppliers of the processes for bidding, selection of the winning bid, and Contract formation, as well as the contractual conditions governing the relationship between the Purchaser and the Supplier. The General and Special Conditions of Contract, the Technical Requirements, and all other documents included in the Bidding Documents reflect the Procurement Guidelines that the Purchaser is obligated to follow during procurement and administration of this Contract.

(b) entities

(i) "Purchaser" means the entity purchasing the Information System, as **specified in the SCC.**

(ii) "Project Manager" means the person **named as such in the SCC** or otherwise appointed by the Purchaser in the manner provided in GCC Clause 18.1 (Project Manager) to perform the duties delegated by the Purchaser.

(iii) "Supplier" means the firm or Joint Venture whose bid to perform the Contract has been accepted by the Purchaser and is named as such in the Contract Agreement.

(iv) "Supplier's Representative" means any person nominated by the Supplier and named as such in the Contract Agreement or otherwise approved by the Purchaser in the manner provided in GCC Clause 18.2 (Supplier's Representative) to perform the duties delegated by the Supplier.

(v) "Subcontractor" means any firm to whom any of the obligations of the Supplier, including preparation of any design or supply of any Information Technologies or other Goods or Services, is subcontracted directly or indirectly by the Supplier.

(vi) "Adjudicator" means the person named in Appendix 2 of the Contract Agreement, appointed by agreement between the Purchaser and the Supplier to make a decision on or to settle any dispute between the Purchaser and the Supplier referred to him or her by the parties,

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pursuant to GCC Clause 6.1 (Adjudication).

(vii) "The World Bank" (also called "The Bank") means the International Bank for Reconstruction and Development (IBRD) or the International Development Association (IDA).

(c) scope

(i) "Information System," also called "the System," means all the Information Technologies, Materials, and other Goods to be supplied, installed, integrated, and made operational (exclusive of the Supplier's Equipment), together with the Services to be carried out by the Supplier under the Contract.

(ii) "Subsystem" means any subset of the System identified as such in the Contract that may be supplied, installed, tested, and commissioned individually before Commissioning of the entire System.

(iii) "Information Technologies" means all information processing and communications-related hardware, Software, supplies, and consumable items that the Supplier is required to supply and install under the Contract.

(iv) "Goods" means all equipment, machinery, furnishings, Materials, and other tangible items that the Supplier is required to supply or supply and install under the Contract, including, without limitation, the Information Technologies and Materials, but excluding the Supplier's Equipment.

(v) "Services" means all technical, logistical, management, and any other Services to be provided by the Supplier under the Contract to supply, install, customize, integrate, and make operational the System. Such Services may include, but are not restricted to, activity management and quality assurance, design, development, customization, documentation, transportation, insurance, inspection, expediting, site preparation, installation, integration, training, data migration, Pre-commissioning, Commissioning, maintenance, and technical support.

(vi) "The Project Plan" means the document to be

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developed by the Supplier and approved by the Purchaser, pursuant to GCC Clause 19, based on the requirements of the Contract and the Preliminary Project Plan included in the Supplier's bid. The "Agreed and Finalized Project Plan" is the version of the Project Plan approved by the Purchaser, in accordance with GCC Clause 19.2. Should the Project Plan conflict with the Contract in any way, the relevant provisions of the Contract, including any amendments, shall prevail.

(vii) "Software" means that part of the System which are instructions that cause information processing Subsystems to perform in a specific manner or execute specific operations.

(viii) "System Software" means Software that provides the operating and management instructions for the underlying hardware and other components, and is identified as such in Appendix 4 of the Contract Agreement and such other Software as the parties may agree in writing to be Systems Software. Such System Software includes, but is not restricted to, micro-code embedded in hardware (i.e., "firmware"), operating systems, communications, system and network management, and utility software.

(ix) "General-Purpose Software" means Software that supports general-purpose office and software development activities and is identified as such in Appendix 4 of the Contract Agreement and such other Software as the parties may agree in writing to be General-Purpose Software. Such General-Purpose Software may include, but is not restricted to, word processing, spreadsheet, generic database management, and application development software.

(x) "Application Software" means Software formulated to perform specific business or technical functions and interface with the business or technical users of the System and is identified as such in Appendix 4 of the Contract Agreement and such other Software as the parties may agree in writing to be Application Software.

(xi) "Standard Software" means Software identified

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as such in Appendix 4 of the Contract Agreement and such other Software as the parties may agree in writing to be Standard Software.

(xii) "Custom Software" means Software identified as such in Appendix 4 of the Contract Agreement and such other Software as the parties may agree in writing to be Custom Software.

(xiii) "Source Code" means the database structures, dictionaries, definitions, program source files, and any other symbolic representations necessary for the compilation, execution, and subsequent maintenance of the Software (typically, but not exclusively, required for Custom Software).

(xiv) "Materials" means all documentation in printed or printable form and all instructional and informational aides in any form (including audio, video, and text) and on any medium, provided to the Purchaser under the Contract.

(xv) "Standard Materials" means all Materials not specified as Custom Materials.

(xvi) "Custom Materials" means Materials developed by the Supplier at the Purchaser's expense under the Contract and identified as such in Appendix 5 of the Contract Agreement and such other Materials as the parties may agree in writing to be Custom Materials. Custom Materials includes Materials created from Standard Materials.

(xvii) "Intellectual Property Rights" means any and all copyright, moral rights, trademark, patent, and other intellectual and proprietary rights, title and interests worldwide, whether vested, contingent, or future, including without limitation all economic rights and all exclusive rights to reproduce, fix, adapt, modify, translate, create derivative works from, extract or re-utilize data from, manufacture, introduce into circulation, publish, distribute, sell, license, sublicense, transfer, rent, lease, transmit or provide access electronically, broadcast, display, enter into computer memory, or otherwise use any portion or copy, in whole or in part, in any form, directly or indirectly, or to authorize or assign others to do so.

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(xviii) "Supplier's Equipment" means all equipment, tools, apparatus, or things of every kind required in or for installation, completion and maintenance of the System that are to be provided by the Supplier, but excluding the Information Technologies, or other items forming part of the System.

(d) activities

(i) "Delivery" means the transfer of the Goods from the Supplier to the Purchaser in accordance with the current edition Incoterms specified in the Contract.

(ii) "Installation" means that the System or a Subsystem as specified in the Contract is ready for Commissioning as provided in GCC Clause 26 (Installation).

(iii) "Pre-commissioning" means the testing, checking, and any other required activity that may be specified in the Technical Requirements that are to be carried out by the Supplier in preparation for Commissioning of the System as provided in GCC Clause 26 (Installation).

(iv) "Commissioning" means operation of the System or any Subsystem by the Supplier following Installation, which operation is to be carried out by the Supplier as provided in GCC Clause 27.1 (Commissioning), for the purpose of carrying out Operational Acceptance Test(s).

(v) "Operational Acceptance Tests" means the tests specified in the Technical Requirements and Agreed and Finalized Project Plan to be carried out to ascertain whether the System, or a specified Subsystem, is able to attain the functional and performance requirements specified in the Technical Requirements and Agreed and Finalized Project Plan, in accordance with the provisions of GCC Clause 27.2 (Operational Acceptance Test).

(vi) "Operational Acceptance" means the acceptance by the Purchaser of the System (or any Subsystem(s) where the Contract provides for acceptance of the System in parts), in accordance with GCC Clause 27.3 (Operational Acceptance).

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(e) place and time

(i) "Purchaser's Country" is the **country named in the SCC.**

(ii) "Supplier's Country" is the country in which the Supplier is legally organized, as named in the Contract Agreement.

(iii) "Project Site(s)" means the place(s) **specified in the SCC** for the supply and installation of the System.

(iv) "Eligible Country" means the countries and territories eligible for participation in procurements financed by the World Bank as defined in the Procurement Guidelines. (**Note:** The World Bank maintains a list of countries from which Bidders, Goods, and Services are not eligible to participate in procurement financed by the Bank. The list is regularly updated and can be obtained from the Public Information Center of the Bank or its web site on procurement. A copy of the list is contained in the Section of the Bidding Documents entitled "Eligible Countries for the Provision of Goods, Works, and Services in Bank-Financed Procurement").

(v) "Day" means calendar day of the Gregorian Calendar.

(vi) "Week" means seven (7) consecutive Days, beginning the day of the week as is customary in the Purchaser's Country.

(vii) "Month" means calendar month of the Gregorian Calendar.

(viii) "Year" means twelve (12) consecutive Months.

(ix) "Effective Date" means the date of fulfillment of all conditions specified in Article 3 (Effective Date for Determining Time for Achieving Operational Acceptance) of the Contract Agreement, for the purpose of determining the Delivery, Installation, and Operational Acceptance dates for the System or Subsystem(s).

(x) "Contract Period" is the time period during which this Contract governs the relations and obligations of the Purchaser and Supplier in

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relation to the System, as **specified in the SCC.**

(xi) "Defect Liability Period" (also referred to as the "Warranty Period") means the period of validity of the warranties given by the Supplier commencing at date of the Operational Acceptance Certificate of the System or Subsystem(s), during which the Supplier is responsible for defects with respect to the System (or the relevant Subsystem[s]) as provided in GCC Clause 29 (Defect Liability).

(xii) "The Post-Warranty Services Period" means the number of years **defined in the SCC** (if any), following the expiration of the Warranty Period during which the Supplier shall be obligated to provide Software, licenses, maintenance, and/or technical support services for the System, under this Contract.

(xiii) "The Coverage Period" means the Days of the Week and the hours of those Days during which maintenance, operational, and/or technical support services (if any) must be available.

2. Contract Documents

2.1 Subject to Article 1.2 (Order of Precedence) of the Contract Agreement, all documents forming part of the Contract (and all parts of these documents) are intended to be correlative, complementary, and mutually explanatory. The Contract shall be read as a whole.

3. Interpretation

3.1 Governing Language

3.1.1 All Contract Documents and related correspondence exchanged between Purchaser and Supplier shall be written in the language **specified in the SCC,** and the Contract shall be construed and interpreted in accordance with that language.

3.1.2 If any of the Contract Documents or related correspondence are prepared in a language other than the governing language under GCC Clause 3.1.1 above, the translation of such documents into the governing language shall prevail in matters of interpretation. The originating party, with respect to such documents shall bear the costs and risks of such translation.

3.2 Singular and Plural

The singular shall include the plural and the plural the singular, except where the context otherwise requires.

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3.3 Headings

The headings and marginal notes in the GCC are included for ease of reference and shall neither constitute a part of the Contract nor affect its interpretation.

3.4 Persons

Words importing persons or parties shall include firms, corporations, and government entities.

3.5 Incoterms

Unless inconsistent with any provision of the Contract, the meaning of any trade term and the rights and obligations of parties thereunder shall be as prescribed by the current Incoterms ("Incoterms 2000" or a more recent version if and as published). Incoterms are the international rules for interpreting trade terms published by the International Chamber of Commerce, 38 Cours Albert 1er, 75008 Paris, France.

3.6 Entire Agreement

The Contract constitutes the entire agreement between the Purchaser and Supplier with respect to the subject matter of Contract and supersedes all communications, negotiations, and agreements (whether written or oral) of parties with respect to the subject matter of the Contract made prior to the date of Contract.

3.7 Amendment

No amendment or other variation of the Contract shall be effective unless it is in writing, is dated, expressly refers to the Contract, and is signed by a duly authorized representative of each party to the Contract.

3.8 Independent Supplier

The Supplier shall be an independent contractor performing the Contract. The Contract does not create any agency, partnership, joint venture, or other joint relationship between the parties to the Contract.

Subject to the provisions of the Contract, the Supplier shall be solely responsible for the manner in which the Contract is performed. All employees, representatives, or Subcontractors engaged by the Supplier in connection with the performance of the Contract shall be under the complete control of the Supplier and shall not be deemed to be employees of the Purchaser, and nothing contained in the Contract or in any subcontract awarded by the Supplier

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shall be construed to create any contractual relationship between any such employees, representatives, or Subcontractors and the Purchaser.

3.9 Joint Venture

If the Supplier is a Joint Venture of two or more firms, all such firms shall be jointly and severally bound to the Purchaser for the fulfillment of the provisions of the Contract and shall designate one of such firms to act as a leader with authority to bind the Joint Venture. The composition or constitution of the Joint Venture shall not be altered without the prior consent of the Purchaser.

3.10 Non-waiver

3.10.1 Subject to GCC Clause 3.10.2 below, no relaxation, forbearance, delay, or indulgence by either party in enforcing any of the terms and conditions of the Contract or the granting of time by either party to the other shall prejudice, affect, or restrict the rights of that party under the Contract, nor shall any waiver by either party of any breach of Contract operate as waiver of any subsequent or continuing breach of Contract.

3.10.2 Any waiver of a party's rights, powers, or remedies under the Contract must be in writing, must be dated and signed by an authorized representative of the party granting such waiver, and must specify the right and the extent to which it is being waived.

3.11 Severability

If any provision or condition of the Contract is prohibited or rendered invalid or unenforceable, such prohibition, invalidity, or unenforceability shall not affect the validity or enforceability of any other provisions and conditions of the Contract.

3.12 Country of Origin

"Origin" means the place where the Information Technologies, Materials, and other Goods for the System were produced or from which the Services are supplied. Goods are produced when, through manufacturing, processing, Software development, or substantial and major assembly or integration of components, a commercially recognized product results that is substantially different in basic characteristics or in purpose or utility from its components. The Origin of Goods and Services is distinct from the nationality of the Supplier and may be different.

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4. Notices

4.1 Unless otherwise stated in the Contract, all notices to be given under the Contract shall be in writing and shall be sent, pursuant to GCC Clause 4.3 below, by personal delivery, airmail post, special courier, cable, telegraph, telex, facsimile, electronic mail, or Electronic Data Interchange (EDI), with the following provisions.

4.1.1 Any notice sent by cable, telegraph, telex, facsimile, electronic mail, or EDI shall be confirmed within two (2) days after dispatch by notice sent by airmail post or special courier, except as otherwise specified in the Contract.

4.1.2 Any notice sent by airmail post or special courier shall be deemed (in the absence of evidence of earlier receipt) to have been delivered ten (10) days after dispatch. In proving the fact of dispatch, it shall be sufficient to show that the envelope containing such notice was properly addressed, stamped, and conveyed to the postal authorities or courier service for transmission by airmail or special courier.

4.1.3 Any notice delivered personally or sent by cable, telegraph, telex, facsimile, electronic mail, or EDI shall be deemed to have been delivered on the date of its dispatch.

4.1.4 Either party may change its postal, cable, telex, facsimile, electronic mail, or EDI addresses for receipt of such notices by ten (10) days' notice to the other party in writing.

4.2 Notices shall be deemed to include any approvals, consents, instructions, orders, certificates, information and other communication to be given under the Contract.

4.3 Pursuant to GCC Clause 18, notices from/to the Purchaser are normally given by, or addressed to, the Project Manager, while notices from/to the Supplier are normally given by, or addressed to, the Supplier's Representative, or in its absence its deputy if any. If there is no appointed Project Manager or Supplier's Representative (or deputy), or if their related authority is limited by the SCC for GCC Clauses 18.1 or 18.2.2, or for any other reason, the Purchaser or Supplier may give and receive notices at their fallback addresses. The address of the Project Manager and the fallback address of the Purchaser are as **specified in the SCC** or as subsequently established/amended. The address of the Supplier's Representative and the fallback address of the Supplier are as specified in Appendix 1 of the Contract Agreement or as subsequently established/amended.

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5. Governing Law

5.1 The Contract shall be governed by and interpreted in accordance with the laws of the country specified in the SCC.

6. Settlement of Disputes

6.1 Adjudication

6.1.1 If any dispute of any kind whatsoever shall arise between the Purchaser and the Supplier in connection with or arising out of the Contract, including without prejudice to the generality of the foregoing, any question regarding its existence, validity, or termination, or the operation of the System (whether during the progress of implementation or after its achieving Operational Acceptance and whether before or after the termination, abandonment, or breach of the Contract), the parties shall seek to resolve any such dispute by mutual consultation. If the parties fail to resolve such a dispute by mutual consultation within fourteen (14) days after one party has notified the other in writing of the dispute, then, if the Contract Agreement in Appendix 2 includes and names an Adjudicator, the dispute shall, within another fourteen (14) days, be referred in writing by either party to the Adjudicator, with a copy to the other party. If there is no Adjudicator specified in the Contract Agreement, the mutual consultation period stated above shall last twenty-eight (28) days (instead of fourteen), upon expiry of which either party may move to the notification of arbitration pursuant to GCC Clause 6.2.1.

6.1.2 The Adjudicator shall give his or her decision in writing to both parties within twenty-eight (28) days of the dispute being referred to the Adjudicator. If the Adjudicator has done so, and no notice of intention to commence arbitration has been given by either the Purchaser or the Supplier within fifty-six (56) days of such reference, the decision shall become final and binding upon the Purchaser and the Supplier. Any decision that has become final and binding shall be implemented by the parties forthwith.

6.1.3 The Adjudicator shall be paid an hourly fee at the rate specified in the Contract Agreement plus reasonable expenditures incurred in the execution of duties as Adjudicator, and these costs shall be divided equally between the Purchaser and the Supplier.

6.1.4 Should the Adjudicator resign or die, or should the Purchaser and the Supplier agree that the Adjudicator is not fulfilling his or her functions in accordance with

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the provisions of the Contract, a new Adjudicator shall be jointly appointed by the Purchaser and the Supplier. Failing agreement between the two within twenty-eight (28) days, the new Adjudicator shall be appointed at the request of either party by the Appointing Authority **specified in the SCC,** or, if no Appointing Authority is **specified in SCC,** the Contract shall, from this point onward and until the parties may otherwise agree on an Adjudicator or an Appointing Authority, be implemented as if there is no Adjudicator.

6.2 Arbitration

6.2.1 If

(a) the Purchaser or the Supplier is dissatisfied with the Adjudicator's decision and acts before this decision has become final and binding pursuant to GCC Clause 6.1.2, or

(b) the Adjudicator fails to give a decision within the allotted time from referral of the dispute pursuant to GCC Clause 6.1.2, and the Purchaser or the Supplier acts within the following fourteen (14) days, or

(c) in the absence of an Adjudicator from the Contract Agreement, the mutual consultation pursuant to GCC Clause 6.1.1 expires without resolution of the dispute and the Purchaser or the Supplier acts within the following fourteen (14) days,

then either the Purchaser or the Supplier may act to give notice to the other party, with a copy for information to the Adjudicator in case an Adjudicator had been involved, of its intention to commence arbitration, as provided below, as to the matter in dispute, and no arbitration in respect of this matter may be commenced unless such notice is given.

6.2.2 Any dispute in respect of which a notice of intention to commence arbitration has been given, in accordance with GCC Clause 6.2.1, shall be finally settled by arbitration. Arbitration may be commenced prior to or after Installation of the Information System.

6.2.3 Arbitration proceedings shall be conducted in accordance with the rules of procedure **specified in the SCC.**

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6.3 Notwithstanding any reference to the Adjudicator or arbitration in this clause,

(a) the parties shall continue to perform their respective obligations under the Contract unless they otherwise agree;

(b) the Purchaser shall pay the Supplier any monies due the Supplier.

B. SUBJECT MATTER OF CONTRACT

7. Scope of the System

7.1 Unless otherwise expressly **limited in the SCC** or Technical Requirements, the Supplier's obligations cover the provision of all Information Technologies, Materials and other Goods as well as the performance of all Services required for the design, development, and implementation (including procurement, quality assurance, assembly, associated site preparation, Delivery, Pre-commissioning, Installation, Testing, and Commissioning) of the System, in accordance with the plans, procedures, specifications, drawings, codes, and any other documents specified in the Contract and the Agreed and Finalized Project Plan.

7.2 The Supplier shall, unless specifically excluded in the Contract, perform all such work and / or supply all such items and Materials not specifically mentioned in the Contract but that can be reasonably inferred from the Contract as being required for attaining Operational Acceptance of the System as if such work and / or items and Materials were expressly mentioned in the Contract.

7.3 The Supplier's obligations (if any) to provide Goods and Services as implied by the Recurrent Cost tables of the Supplier's bid, such as consumables, spare parts, and technical services (e.g., maintenance, technical assistance, and operational support), are as **specified in the SCC,** including the relevant terms, characteristics, and timings.

8. Time for Commencement and Operational Acceptance

8.1 The Supplier shall commence work on the System within the period **specified in the SCC,** and without prejudice to GCC Clause 28.2, the Supplier shall thereafter proceed with the System in accordance with the time schedule specified in the Implementation Schedule in the Technical Requirements Section and any refinements made in the Agreed and Finalized Project Plan.

8.2 The Supplier shall achieve Operational Acceptance of the System (or Subsystem(s) where a separate time for Operational Acceptance of such Subsystem(s) is specified in the Contract) within the time **specified in the SCC** and in

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accordance with the time schedule specified in the Implementation Schedule in the Technical Requirements Section and any refinements made in the Agreed and Finalized Project Plan, or within such extended time to which the Supplier shall be entitled under GCC Clause 40 (Extension of Time for Achieving Operational Acceptance).

9. Supplier's Responsibilities

9.1 The Supplier shall conduct all activities with due care and diligence, in accordance with the Contract and with the skill and care expected of a competent provider of information technologies, information systems, support, maintenance, training, and other related services, or in accordance with best industry practices. In particular, the Supplier shall provide and employ only technical personnel who are skilled and experienced in their respective callings and supervisory staff who are competent to adequately supervise the work at hand.

9.2 The Supplier confirms that it has entered into this Contract on the basis of a proper examination of the data relating to the System provided by the Purchaser and on the basis of information that the Supplier could have obtained from a visual inspection of the site (if access to the site was available) and of other data readily available to the Supplier relating to the System as at the date twenty-eight (28) days prior to bid submission. The Supplier acknowledges that any failure to acquaint itself with all such data and information shall not relieve its responsibility for properly estimating the difficulty or cost of successfully performing the Contract.

9.3 The Supplier shall be responsible for timely provision of all resources, information, and decision making under its control that are necessary to reach a mutually Agreed and Finalized Project Plan (pursuant to GCC Clause 19.2) within the time schedule specified in the Implementation Schedule in the Technical Requirements Section. Failure to provide such resources, information, and decision making may constitute grounds for termination pursuant to GCC Clause 41.2.

9.4 The Supplier shall acquire in its name all permits, approvals, and/or licenses from all local, state, or national government authorities or public service undertakings in the Purchaser's Country that are necessary for the performance of the Contract, including, without limitation, visas for the Supplier's and Subcontractor's personnel and entry permits for all imported Supplier's Equipment. The Supplier shall acquire all other permits, approvals, and/or licenses that are not the responsibility of the Purchaser under GCC Clause 10.4 and that are necessary for the performance of the

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Contract.

9.5 The Supplier shall comply with all laws in force in the Purchaser's Country. The laws will include all national, provincial, municipal, or other laws that affect the performance of the Contract and are binding upon the Supplier. The Supplier shall indemnify and hold harmless the Purchaser from and against any and all liabilities, damages, claims, fines, penalties, and expenses of whatever nature arising or resulting from the violation of such laws by the Supplier or its personnel, including the Subcontractors and their personnel, but without prejudice to GCC Clause 10.1. The Supplier shall not indemnify the Purchaser to the extent that such liability, damage, claims, fines, penalties, and expenses were caused or contributed to by a fault of the Purchaser.

9.6 The Supplier shall, in all dealings with its labor and the labor of its Subcontractors currently employed on or connected with the Contract, pay due regard to all recognized festivals, official holidays, religious or other customs, and all local laws and regulations pertaining to the employment of labor.

9.7 Any Information Technologies or other Goods and Services that will be incorporated in or be required for the System and other supplies shall have their Origin, as defined in GCC Clause 3.12, in a country that shall be an Eligible Country, as defined in GCC Clause 1.1 (e) (iv).

9.8 The Supplier shall permit the Bank and/or persons appointed by the Bank to inspect the Supplier's offices and/or the accounts and records of the Supplier and its sub-contractors relating to the performance of the Contract, and to have such accounts and records audited by auditors appointed by the Bank if required by the Bank. The Supplier's attention is drawn to Sub Clause 41.2.1(e), which provides, inter alia, that acts intended to materially impede the exercise of the Bank's inspection and audit rights provided for under Sub-Clause 9.8 constitute a prohibited practice subject to contract termination (as well as to a determination of ineligibility under the Procurement Guidelines)

9.9 Other Supplier responsibilities, if any, are as **stated in the SCC.**

10. Purchaser's Responsibilities

10.1 The Purchaser shall ensure the accuracy of all information and/or data to be supplied by the Purchaser to the Supplier, except when otherwise expressly stated in the Contract.

10.2 The Purchaser shall be responsible for timely provision of all resources, information, and decision making under its control that are necessary to reach an Agreed and Finalized Project

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Plan (pursuant to GCC Clause 19.2) within the time schedule specified in the Implementation Schedule in the Technical Requirements Section. Failure to provide such resources, information, and decision making may constitute grounds for Termination pursuant to GCC Clause 41.3.1 (b).

10.3 The Purchaser shall be responsible for acquiring and providing legal and physical possession of the site and access to it, and for providing possession of and access to all other areas reasonably required for the proper execution of the Contract.

10.4 If requested by the Supplier, the Purchaser shall use its best endeavors to assist the Supplier in obtaining in a timely and expeditious manner all permits, approvals, and/or licenses necessary for the execution of the Contract from all local, state, or national government authorities or public service undertakings that such authorities or undertakings require the Supplier or Subcontractors or the personnel of the Supplier or Subcontractors, as the case may be, to obtain.

10.5 In such cases where the responsibilities of specifying and acquiring or upgrading telecommunications and/or electric power services falls to the Supplier, as specified in the Technical Requirements, SCC, Agreed and Finalized Project Plan, or other parts of the Contract, the Purchaser shall use its best endeavors to assist the Supplier in obtaining such services in a timely and expeditious manner.

10.6 The Purchaser shall be responsible for timely provision of all resources, access, and information necessary for the Installation and Operational Acceptance of the System (including, but not limited to, any required telecommunications or electric power services), as identified in the Agreed and Finalized Project Plan, except where provision of such items is explicitly identified in the Contract as being the responsibility of the Supplier. Delay by the Purchaser may result in an appropriate extension of the Time for Operational Acceptance, at the Supplier's discretion.

10.7 Unless otherwise specified in the Contract or agreed upon by the Purchaser and the Supplier, the Purchaser shall provide sufficient, properly qualified operating and technical personnel, as required by the Supplier to properly carry out Delivery, Pre-commissioning, Installation, Commissioning, and Operational Acceptance, at or before the time specified in the Technical Requirements Section's Implementation Schedule and the Agreed and Finalized Project Plan.

10.8 The Purchaser will designate appropriate staff for the training courses to be given by the Supplier and shall make all appropriate logistical arrangements for such training as

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specified in the Technical Requirements, SCC, the Agreed and Finalized Project Plan, or other parts of the Contract.

10.9 The Purchaser assumes primary responsibility for the Operational Acceptance Test(s) for the System, in accordance with GCC Clause 27.2, and shall be responsible for the continued operation of the System after Operational Acceptance. However, this shall not limit in any way the Supplier's responsibilities after the date of Operational Acceptance otherwise specified in the Contract.

10.10 The Purchaser is responsible for performing and safely storing timely and regular backups of its data and Software in accordance with accepted data management principles, except where such responsibility is clearly assigned to the Supplier elsewhere in the Contract.

10.11 All costs and expenses involved in the performance of the obligations under this GCC Clause 10 shall be the responsibility of the Purchaser, save those to be incurred by the Supplier with respect to the performance of the Operational Acceptance Test(s), in accordance with GCC Clause 27.2.

10.12 Other Purchaser responsibilities, if any, are **as stated in the SCC.**

C. PAYMENT

11. Contract Price

11.1 The Contract Price shall be as specified in Article 2 (Contract Price and Terms of Payment) of the Contract Agreement.

11.2 The Contract Price shall be a firm lump sum not subject to any alteration, except:

(a) in the event of a Change in the System pursuant to GCC Clause 39 or to other clauses in the Contract;

(b) in accordance with the price adjustment formula (if any) **specified in the SCC.**

11.3 The Supplier shall be deemed to have satisfied itself as to the correctness and sufficiency of the Contract Price, which shall, except as otherwise provided for in the Contract, cover all its obligations under the Contract.

12. Terms of Payment

12.1 The Supplier's request for payment shall be made to the Purchaser in writing, accompanied by an invoice describing, as appropriate, the System or Subsystem(s), Delivered, Pre-commissioned, Installed, and Operationally Accepted, and

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by documents submitted pursuant to GCC Clause 22.5 and upon fulfillment of other obligations stipulated in the Contract.

The Contract Price shall be paid as **specified in the SCC.**

12.2 No payment made by the Purchaser herein shall be deemed to constitute acceptance by the Purchaser of the System or any Subsystem(s).

12.3 Payments shall be made promptly by the Purchaser, but in no case later than forty five (45) days after submission of a valid invoice by the Supplier. In the event that the Purchaser fails to make any payment by its respective due date or within the period set forth in the Contract, the Purchaser shall pay to the Supplier interest on the amount of such delayed payment at the rate(s) **specified in the SCC** for the period of delay until payment has been made in full, whether before or after judgment or arbitration award.

12.4 All payments shall be made in the currency(ies) specified in the Contract Agreement, pursuant to GCC Clause 11. For Goods and Services supplied locally, payments shall be made in the currency of the Purchaser's Country, unless otherwise **specified in the SCC.**

12.5 Unless otherwise **specified in the SCC,** payment of the foreign currency portion of the Contract Price for Goods supplied from outside the Purchaser's Country shall be made to the Supplier through an irrevocable letter of credit opened by an authorized bank in the Supplier's Country and will be payable on presentation of the appropriate documents. It is agreed that the letter of credit will be subject to Article 10 of the latest revision of Uniform Customs and Practice for Documentary Credits, published by the International Chamber of Commerce, Paris.

13. Securities

13.1 Issuance of Securities

The Supplier shall provide the securities specified below in favor of the Purchaser at the times and in the amount, manner, and form specified below.

13.2 Advance Payment Security

13.2.1 As **specified in the SCC,** the Supplier shall provide a security equal in amount and currency to the advance payment, and valid until the System is Operationally Accepted.

13.2.2 The security shall be in the form provided in the Bidding Documents or in another form acceptable to the Purchaser. The amount of the security shall be

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reduced in proportion to the value of the System executed by and paid to the Supplier from time to time and shall automatically become null and void when the full amount of the advance payment has been recovered by the Purchaser. The way the value of the security is deemed to become reduced and, eventually, voided is as **specified in the SCC.** The security shall be returned to the Supplier immediately after its expiration.

13.3 Performance Security

13.3.1 The Supplier shall, within twenty-eight (28) days of the notification of Contract award, provide a security for the due performance of the Contract in the amount and currency **specified in the SCC.**

13.3.2 The security shall be a bank guarantee in the form provided in the Sample Forms Section of the Bidding Documents, or it shall be in another form acceptable to the Purchaser.

13.3.3 The security shall automatically become null and void once all the obligations of the Supplier under the Contract have been fulfilled, including, but not limited to, any obligations during the Warranty Period and any extensions to the period. The security shall be returned to the Supplier no later than twenty-eight (28) days after its expiration.

13.3.4 Upon Operational Acceptance of the entire System, the security shall be reduced to the amount **specified in the SCC,** on the date of such Operational Acceptance, so that the reduced security would only cover the remaining warranty obligations of the Supplier.

14. Taxes and Duties

14.1 For Goods or Services supplied from outside the Purchaser's country, the Supplier shall be entirely responsible for all taxes, stamp duties, license fees, and other such levies imposed outside the Purchaser's country. Any duties, such as importation or customs duties, and taxes and other levies, payable in the Purchaser's country for the supply of Goods and Services from outside the Purchaser's country are the responsibility of the Purchaser unless these duties or taxes have been made part of the Contract Price in Article 2 of the Contract Agreement and the Price Schedule it refers to, in which case the duties and taxes will be the Supplier's responsibility.

14.2 For Goods or Services supplied locally, the Supplier shall be entirely responsible for all taxes, duties, license fees, etc.,

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incurred until delivery of the contracted Goods or Services to the Purchaser. The only exception are taxes or duties, such as value-added or sales tax or stamp duty as apply to, or are clearly identifiable, on the invoices and provided they apply in the Purchaser's country, and only if these taxes, levies and/or duties are also excluded from the Contract Price in Article 2 of the Contract Agreement and the Price Schedule it refers to.

14.3 If any tax exemptions, reductions, allowances, or privileges may be available to the Supplier in the Purchaser's Country, the Purchaser shall use its best efforts to enable the Supplier to benefit from any such tax savings to the maximum allowable extent.

14.4 For the purpose of the Contract, it is agreed that the Contract Price specified in Article 2 (Contract Price and Terms of Payment) of the Contract Agreement is based on the taxes, duties, levies, and charges prevailing at the date twenty-eight (28) days prior to the date of bid submission in the Purchaser's Country (also called "Tax" in this GCC Clause 14.4). If any Tax rates are increased or decreased, a new Tax is introduced, an existing Tax is abolished, or any change in interpretation or application of any Tax occurs in the course of the performance of the Contract, which was or will be assessed on the Supplier, its Subcontractors, or their employees in connection with performance of the Contract, an equitable adjustment to the Contract Price shall be made to fully take into account any such change by addition to or reduction from the Contract Price, as the case may be.

D. Intellectual Property

15. Copyright

15.1 The Intellectual Property Rights in all Standard Software and Standard Materials shall remain vested in the owner of such rights.

15.2 The Purchaser agrees to restrict use, copying, or duplication of the Standard Software and Standard Materials in accordance with GCC Clause 16, except that additional copies of Standard Materials may be made by the Purchaser for use within the scope of the project of which the System is a part, in the event that the Supplier does not deliver copies within thirty (30) days from receipt of a request for such Standard Materials.

15.3 The Purchaser's contractual rights to use the Standard Software or elements of the Standard Software may not be assigned, licensed, or otherwise transferred voluntarily except in accordance with the relevant license agreement or

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as may be otherwise **specified in the SCC.**

15.4 As applicable, the Purchaser's and Supplier's rights and obligations with respect to Custom Software or elements of the Custom Software, including any license agreements, and with respect to Custom Materials or elements of the Custom Materials, are specified in the SCC. **Subject to the SCC,** the Intellectual Property Rights in all Custom Software and Custom Materials specified in Appendices 4 and 5 of the Contract Agreement (if any) shall, at the date of this Contract or on creation of the rights (if later than the date of this Contract), vest in the Purchaser. The Supplier shall do and execute or arrange for the doing and executing of each necessary act, document, and thing that the Purchaser may consider necessary or desirable to perfect the right, title, and interest of the Purchaser in and to those rights. In respect of such Custom Software and Custom Materials, the Supplier shall ensure that the holder of a moral right in such an item does not assert it, and the Supplier shall, if requested to do so by the Purchaser and where permitted by applicable law, ensure that the holder of such a moral right waives it.

15.5 The parties shall enter into such (if any) escrow arrangements in relation to the Source Code to some or all of the Software as are **specified in the SCC** and in **accordance with the SCC.**

16. Software License Agreements

16.1 Except to the extent that the Intellectual Property Rights in the Software vest in the Purchaser, the Supplier hereby grants to the Purchaser license to access and use the Software, including all inventions, designs, and marks embodied in the Software.

Such license to access and use the Software shall:

(a) be:

(i) nonexclusive;

(ii) fully paid up and irrevocable (except that it shall terminate if the Contract terminates under GCC Clauses 41.1 or 41.3);

(iii) valid throughout the territory of the Purchaser's Country (or such other territory as **specified in the SCC);** and

(iv) subject to additional restrictions (if any) as **specified in the SCC.**

(b) permit the Software to be:

(i) used or copied for use on or with the computer(s)

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for which it was acquired (if specified in the Technical Requirements and/or the Supplier's bid), plus a backup computer(s) of the same or similar capacity, if the primary is(are) inoperative, and during a reasonable transitional period when use is being transferred between primary and backup;

(ii) as **specified in the SCC,** used or copied for use on or transferred to a replacement computer(s), (and use on the original and replacement computer(s) may be simultaneous during a reasonable transitional period) provided that, if the Technical Requirements and/or the Supplier's bid specifies a class of computer to which the license is restricted and unless the Supplier agrees otherwise in writing, the replacement computer(s) is(are) within that class;

(iii) if the nature of the System is such as to permit such access, accessed from other computers connected to the primary and/or backup computer(s) by means of a local or wide-area network or similar arrangement. and used on or copied for use on those other computers to the extent necessary to that access:

(iv) reproduced for safekeeping or backup purposes;

(v) customized, adapted, or combined with other computer software for use by the Purchaser, provided that derivative software incorporating any substantial part of the delivered, restricted Software shall be subject to same restrictions as are set forth in this Contract;

(vi) as **specified in the SCC,** disclosed to, and reproduced for use by, support service suppliers and their subcontractors, (and the Purchaser may sublicense such persons to use and copy for use the Software) to the extent reasonably necessary to the performance of their support service contracts, subject to the same restrictions as are set forth in this Contract; and

(vii) disclosed to, and reproduced for use by, the Purchaser and by such other persons as are **specified in the SCC** (and the Purchaser may sublicense such persons to use and copy for use the Software), subject to the same restrictions as are set forth in this Contract.

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16.2 The Standard Software may be subject to audit by the Supplier, in accordance with the terms **specified in the SCC,** to verify compliance with the above license agreements.

17. Confidential Information

17.1 Except if otherwise **specified in the SCC,** the "Receiving Party" (either the Purchaser or the Supplier) shall keep confidential and shall not, without the written consent of the other party to this Contract ("the Disclosing Party"), divulge to any third party any documents, data, or other information of a confidential nature ("Confidential Information") connected with this Contract, and furnished directly or indirectly by the Disclosing Party prior to or during performance, or following termination, of this Contract.

17.2 For the purposes of GCC Clause 17.1, the Supplier is also deemed to be the Receiving Party of Confidential Information generated by the Supplier itself in the course of the performance of its obligations under the Contract and relating to the businesses, finances, suppliers, employees, or other contacts of the Purchaser or the Purchaser's use of the System.

17.3 Notwithstanding GCC Clauses 17.1 and 17.2:

(a) the Supplier may furnish to its Subcontractor Confidential Information of the Purchaser to the extent reasonably required for the Subcontractor to perform its work under the Contract; and

(b) the Purchaser may furnish Confidential Information of the Supplier: (i) to its support service suppliers and their subcontractors to the extent reasonably required for them to perform their work under their support service contracts; and (ii) to its affiliates and subsidiaries.

in which event the Receiving Party shall ensure that the person to whom it furnishes Confidential Information of the Disclosing Party is aware of and abides by the Receiving Party's obligations under this GCC Clause 17 as if that person were party to the Contract in place of the Receiving Party.

17.4 The Purchaser shall not, without the Supplier's prior written consent, use any Confidential Information received from the Supplier for any purpose other than the operation, maintenance and further development of the System. Similarly, the Supplier shall not, without the Purchaser's prior written consent, use any Confidential Information received from the Purchaser for any purpose other than those that are required for the performance of the Contract.

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17.5 The obligation of a party under GCC Clauses 17.1 through 17.4 above, however, shall not apply to that information which:

(a) now or hereafter enters the public domain through no fault of the Receiving Party;

(b) can be proven to have been possessed by the Receiving Party at the time of disclosure and that was not previously obtained, directly or indirectly, from the Disclosing Party;

(c) otherwise lawfully becomes available to the Receiving Party from a third party that has no obligation of confidentiality.

17.6 The above provisions of this GCC Clause 17 shall not in any way modify any undertaking of confidentiality given by either of the parties to this Contract prior to the date of the Contract in respect of the System or any part thereof.

17.7 The provisions of this GCC Clause 17 shall survive the termination, for whatever reason, of the Contract for three (3) years or such longer period as may be **specified in the SCC**.

E. Supply, Installation, Testing, Commissioning, and Acceptance of the System

18. Representatives 18.1 Project Manager

If the Project Manager is not named in the Contract, then within fourteen (14) days of the Effective Date, the Purchaser shall appoint and notify the Supplier in writing of the name of the Project Manager. The Purchaser may from time to time appoint some other person as the Project Manager in place of the person previously so appointed and shall give a notice of the name of such other person to the Supplier without delay. No such appointment shall be made at such a time or in such a manner as to impede the progress of work on the System. Such appointment shall take effect only upon receipt of such notice by the Supplier. Subject to the extensions and/or limitations **specified in the SCC** (if any), the Project Manager shall have the authority to represent the Purchaser on all day-to-day matters relating to the System or arising from the Contract, and shall normally be the person giving or receiving notices on behalf of the Purchaser pursuant to GCC Clause 4.

18.2 Supplier's Representative

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18.2.1 If the Supplier's Representative is not named in the Contract, then within fourteen (14) days of the Effective Date, the Supplier shall appoint the Supplier's Representative and shall request the Purchaser in writing to approve the person so appointed. The request must be accompanied by a detailed curriculum vitae for the nominee, as well as a description of any other System or non-System responsibilities the nominee would retain while performing the duties of the Supplier's Representative. If the Purchaser does not object to the appointment within fourteen (14) days, the Supplier's Representative shall be deemed to have been approved. If the Purchaser objects to the appointment within fourteen (14) days giving the reason therefor, then the Supplier shall appoint a replacement within fourteen (14) days of such objection in accordance with this GCC Clause 18.2.1.

18.2.2 Subject to the extensions and/or limitations **specified in the SCC** (if any), the Supplier's Representative shall have the authority to represent the Supplier on all day-to-day matters relating to the System or arising from the Contract, and shall normally be the person giving or receiving notices on behalf of the Supplier pursuant to GCC Clause 4.

18.2.3 The Supplier shall not revoke the appointment of the Supplier's Representative without the Purchaser's prior written consent, which shall not be unreasonably withheld. If the Purchaser consents to such an action, the Supplier shall appoint another person of equal or superior qualifications as the Supplier's Representative, pursuant to the procedure set out in GCC Clause 18.2.1.

18.2.4 The Supplier's Representative and staff are obliged to work closely with the Purchaser's Project Manager and staff, act within their own authority, and abide by directives issued by the Purchaser that are consistent with the terms of the Contract. The Supplier's Representative is responsible for managing the activities of its personnel and any subcontracted personnel.

18.2.5 The Supplier's Representative may, subject to the approval of the Purchaser (which shall not be unreasonably withheld), at any time delegate to any person any of the powers, functions, and authorities vested in him or her. Any such delegation may be revoked at any time. Any such delegation or

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revocation shall be subject to a prior notice signed by the Supplier's Representative and shall specify the powers, functions, and authorities thereby delegated or revoked. No such delegation or revocation shall take effect unless and until the notice of it has been delivered.

18.2.6 Any act or exercise by any person of powers, functions and authorities so delegated to him or her in accordance with GCC Clause 18.2.5 shall be deemed to be an act or exercise by the Supplier's Representative.

18.3 Objections and Removals

18.3.1 The Purchaser may by notice to the Supplier object to any representative or person employed by the Supplier in the execution of the Contract who, in the reasonable opinion of the Purchaser, may have behaved inappropriately, be incompetent, or be negligent. The Purchaser shall provide evidence of the same, whereupon the Supplier shall remove such person from work on the System.

18.3.2 If any representative or person employed by the Supplier is removed in accordance with GCC Clause 18.3.1, the Supplier shall, where required, promptly appoint a replacement.

19. Project Plan

19.1 In close cooperation with the Purchaser and based on the Preliminary Project Plan included in the Supplier's bid, the Supplier shall develop a Project Plan encompassing the activities specified in the Contract. The contents of the Project Plan shall be as **specified in the SCC** and/or Technical Requirements.

19.2 The Supplier shall formally present to the Purchaser the Project Plan in accordance with the procedure specified in the SCC.

19.3 If required, the impact on the Implementation Schedule of modifications agreed during finalization of the Agreed and Finalized Project Plan shall be incorporated in the Contract by amendment, in accordance with GCC Clauses 39 and 40.

19.4 The Supplier shall undertake to supply, install, test, and commission the System in accordance with the Agreed and Finalized Project Plan and the Contract.

19.5 The Progress and other reports **specified in the SCC** shall be prepared by the Supplier and submitted to the Purchaser in the format and frequency specified in the Technical

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Requirements.

20. Subcontracting

20.1 Appendix 3 (List of Approved Subcontractors) to the Contract Agreement specifies critical items of supply or services and a list of Subcontractors for each item that are considered acceptable by the Purchaser. If no Subcontractors are listed for an item, the Supplier shall prepare a list of Subcontractors it considers qualified and wishes to be added to the list for such items. The Supplier may from time to time propose additions to or deletions from any such list. The Supplier shall submit any such list or any modification to the list to the Purchaser for its approval in sufficient time so as not to impede the progress of work on the System. The Purchaser shall not withhold such approval unreasonably. Such approval by the Purchaser of a Subcontractor(s) shall not relieve the Supplier from any of its obligations, duties, or responsibilities under the Contract.

20.2 The Supplier may, at its discretion, select and employ Subcontractors for such critical items from those Subcontractors listed pursuant to GCC Clause 20.1. If the Supplier wishes to employ a Subcontractor not so listed, or subcontract an item not so listed, it must seek the Purchaser's prior approval under GCC Clause 20.3.

20.3 For items for which pre-approved Subcontractor lists have not been specified in Appendix 3 to the Contract Agreement, the Supplier may employ such Subcontractors as it may select, provided: (i) the Supplier notifies the Purchaser in writing at least twenty-eight (28) days prior to the proposed mobilization date for such Subcontractor; and (ii) by the end of this period either the Purchaser has granted its approval in writing or fails to respond. The Supplier shall not engage any Subcontractor to which the Purchaser has objected in writing prior to the end of the notice period. The absence of a written objection by the Purchaser during the above specified period shall constitute formal acceptance of the proposed Subcontractor. Except to the extent that it permits the deemed approval of the Purchaser of Subcontractors not listed in the Contract Agreement, nothing in this Clause, however, shall limit the rights and obligations of either the Purchaser or Supplier as they are specified in GCC Clauses 20.1 and 20.2, in the SCC, or in Appendix 3 of the Contract Agreement.

21. Design and Engineering

21.1 Technical Specifications and Drawings

21.1.1 The Supplier shall execute the basic and detailed design and the implementation activities necessary for successful installation of the System in compliance with the provisions of the Contract or, where not so

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specified, in accordance with good industry practice.

The Supplier shall be responsible for any discrepancies, errors or omissions in the specifications, drawings, and other technical documents that it has prepared, whether such specifications, drawings, and other documents have been approved by the Project Manager or not, provided that such discrepancies, errors, or omissions are not because of inaccurate information furnished in writing to the Supplier by or on behalf of the Purchaser.

21.1.2 The Supplier shall be entitled to disclaim responsibility for any design, data, drawing, specification, or other document, or any modification of such design, drawings, specification, or other documents provided or designated by or on behalf of the Purchaser, by giving a notice of such disclaimer to the Project Manager.

21.2 Codes and Standards

Wherever references are made in the Contract to codes and standards in accordance with which the Contract shall be executed, the edition or the revised version of such codes and standards current at the date twenty-eight (28) days prior to date of bid submission shall apply unless otherwise **specified in the SCC.** During Contract execution, any changes in such codes and standards shall be applied after approval by the Purchaser and shall be treated in accordance with GCC Clause 39.3.

21.3 Approval/Review of Technical Documents by the Project Manager

21.3.1 The Supplier shall prepare and furnish to the Project Manager the documents as **specified in the SCC** for the Project Manager's approval or review.

Any part of the System covered by or related to the documents to be approved by the Project Manager shall be executed only after the Project Manager's approval of these documents.

GCC Clauses 21.3.2 through 21.3.7 shall apply to those documents requiring the Project Manager's approval, but not to those furnished to the Project Manager for its review only.

21.3.2 Within fourteen (14) days after receipt by the Project Manager of any document requiring the Project

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Manager's approval in accordance with GCC Clause 21.3.1, the Project Manager shall either return one copy of the document to the Supplier with its approval endorsed on the document or shall notify the Supplier in writing of its disapproval of the document and the reasons for disapproval and the modifications that the Project Manager proposes. If the Project Manager fails to take such action within the fourteen (14) days, then the document shall be deemed to have been approved by the Project Manager.

21.3.3 The Project Manager shall not disapprove any document except on the grounds that the document does not comply with some specified provision of the Contract or that it is contrary to good industry practice.

21.3.4 If the Project Manager disapproves the document, the Supplier shall modify the document and resubmit it for the Project Manager's approval in accordance with GCC Clause 21.3.2. If the Project Manager approves the document subject to modification(s), the Supplier shall make the required modification(s), and the document shall then be deemed to have been approved, subject to GCC Clause 21.3.5. The procedure set out in GCC Clauses 21.3.2 through 21.3.4 shall be repeated, as appropriate, until the Project Manager approves such documents.

21.3.5 If any dispute occurs between the Purchaser and the Supplier in connection with or arising out of the disapproval by the Project Manager of any document and/or any modification(s) to a document that cannot be settled between the parties within a reasonable period, then, in case the Contract Agreement includes and names an Adjudicator, such dispute may be referred to the Adjudicator for determination in accordance with GCC Clause 6.1 (Adjudicator). If such dispute is referred to an Adjudicator, the Project Manager shall give instructions as to whether and if so, how, performance of the Contract is to proceed. The Supplier shall proceed with the Contract in accordance with the Project Manager's instructions, provided that if the Adjudicator upholds the Supplier's view on the dispute and if the Purchaser has not given notice under GCC Clause 6.1.2, then the Supplier shall be reimbursed by the Purchaser for any additional costs incurred by reason of such instructions and shall be relieved of such responsibility or liability in connection with the dispute and the execution of the instructions as the

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Adjudicator shall decide, and the Time for Achieving Operational Acceptance shall be extended accordingly.

21.3.6 The Project Manager's approval, with or without modification of the document furnished by the Supplier, shall not relieve the Supplier of any responsibility or liability imposed upon it by any provisions of the Contract except to the extent that any subsequent failure results from modifications required by the Project Manager or inaccurate information furnished in writing to the Supplier by or on behalf of the Purchaser.

21.3.7 The Supplier shall not depart from any approved document unless the Supplier has first submitted to the Project Manager an amended document and obtained the Project Manager's approval of the document, pursuant to the provisions of this GCC Clause 21.3. If the Project Manager requests any change in any already approved document and/or in any document based on such an approved document, the provisions of GCC Clause 39 (Changes to the System) shall apply to such request.

22. Procurement, Delivery, and Transport

22.1 Subject to related Purchaser's responsibilities pursuant to GCC Clauses 10 and 14, the Supplier shall manufacture or procure and transport all the Information Technologies, Materials, and other Goods in an expeditious and orderly manner to the Project Site.

22.2 Delivery of the Information Technologies, Materials, and other Goods shall be made by the Supplier in accordance with the Technical Requirements.

22.3 Early or partial deliveries require the explicit written consent of the Purchaser, which consent shall not be unreasonably withheld.

22.4 Transportation

22.4.1 The Supplier shall provide such packing of the Goods as is required to prevent their damage or deterioration during shipment. The packing, marking, and documentation within and outside the packages shall comply strictly with the Purchaser's instructions to the Supplier.

22.4.2 The Supplier will bear responsibility for and cost of transport to the Project Sites in accordance with the terms and conditions used in the specification of prices in the Price Schedules, including the terms and

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conditions of the associated Incoterms.

22.4.3 Unless otherwise **specified in the SCC,**the Supplier shall be free to use transportation through carriers registered in any eligible country and to obtain insurance from any eligible source country.

22.5 Unless otherwise **specified in the SCC,** the Supplier will provide the Purchaser with shipping and other documents, as specified below:

22.5.1 For Goods supplied from outside the Purchaser's Country:

Upon shipment, the Supplier shall notify the Purchaser and the insurance company contracted by the Supplier to provide cargo insurance by telex, cable, facsimile, electronic mail, or EDI with the full details of the shipment. The Supplier shall promptly send the following documents to the Purchaser by mail or courier, as appropriate, with a copy to the cargo insurance company:

(a) two copies of the Supplier's invoice showing the description of the Goods, quantity, unit price, and total amount;

(b) usual transportation documents;

(c) insurance certificate;

(d) certificate(s) of origin; and

(e) estimated time and point of arrival in the Purchaser's Country and at the site.

22.5.2 For Goods supplied locally (i.e., from within the Purchaser's country):

Upon shipment, the Supplier shall notify the Purchaser by telex, cable, facsimile, electronic mail, or EDI with the full details of the shipment. The Supplier shall promptly send the following documents to the Purchaser by mail or courier, as appropriate:

(a) two copies of the Supplier's invoice showing the Goods' description, quantity, unit price, and total amount;

(b) delivery note, railway receipt, or truck receipt;

(c) certificate of insurance;

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(d) certificate(s) of origin; and

(e) estimated time of arrival at the site.

22.6 Customs Clearance

(a) The Purchaser will bear responsibility for, and cost of, customs clearance into the Purchaser's country in accordance the particular Incoterm(s) used for Goods supplied from outside the Purchaser's country in the Price Schedules referred to by Article 2 of the Contract Agreement.

(b) At the request of the Purchaser, the Supplier will make available a representative or agent during the process of customs clearance in the Purchaser's country for goods supplied from outside the Purchaser's country. In the event of delays in customs clearance that are not the fault of the Supplier:

(i) the Supplier shall be entitled to an extension in the Time for Achieving Operational Acceptance, pursuant to GCC Clause 40;

(ii) the Contract Price shall be adjusted to compensate the Supplier for any additional storage charges that the Supplier may incur as a result of the delay.

23. Product Upgrades

23.1 At any point during performance of the Contract, should technological advances be introduced by the Supplier for Information Technologies originally offered by the Supplier in its bid and still to be delivered, the Supplier shall be obligated to offer to the Purchaser the latest versions of the available Information Technologies having equal or better performance or functionality at the same or lesser unit prices, pursuant to GCC Clause 39 (Changes to the System).

23.2 At any point during performance of the Contract, for Information Technologies still to be delivered, the Supplier will also pass on to the Purchaser any cost reductions and additional and/or improved support and facilities that it offers to other clients of the Supplier in the Purchaser's Country, pursuant to GCC Clause 39 (Changes to the System).

23.3 During performance of the Contract, the Supplier shall offer to the Purchaser all new versions, releases, and updates of Standard Software, as well as related documentation and technical support services, within thirty (30) days of their availability from the Supplier to other clients of the Supplier in the Purchaser's Country, and no later than twelve (12)

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months after they are released in the country of origin. In no case will the prices for these Software exceed those quoted by the Supplier in the Recurrent Costs tables in its bid.

23.4 During the Warranty Period, unless otherwise **specified in the SCC,** the Supplier will provide at no additional cost to the Purchaser all new versions, releases, and updates for all Standard Software that are used in the System, within thirty (30) days of their availability from the Supplier to other clients of the Supplier in the Purchaser's country, and no later than twelve (12) months after they are released in the country of origin of the Software.

23.5 The Purchaser shall introduce all new versions, releases or updates of the Software within eighteen (18) months of receipt of a production-ready copy of the new version, release, or update, provided that the new version, release, or update does not adversely affect System operation or performance or require extensive reworking of the System. In cases where the new version, release, or update adversely affects System operation or performance, or requires extensive reworking of the System, the Supplier shall continue to support and maintain the version or release previously in operation for as long as necessary to allow introduction of the new version, release, or update. In no case shall the Supplier stop supporting or maintaining a version or release of the Software less than twenty four (24) months after the Purchaser receives a production-ready copy of a subsequent version, release, or update. The Purchaser shall use all reasonable endeavors to implement any new version, release, or update as soon as practicable, subject to the twenty-four-month-long stop date.

24. Implementation, Installation, and Other Services

24.1 The Supplier shall provide all Services specified in the Contract and Agreed and Finalized Project Plan in accordance with the highest standards of professional competence and integrity.

24.2 Prices charged by the Supplier for Services, if not included in the Contract, shall be agreed upon in advance by the parties (including, but not restricted to, any prices submitted by the Supplier in the Recurrent Cost Schedules of its Bid) and shall not exceed the prevailing rates charged by the Supplier to other purchasers in the Purchaser's Country for similar services.

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25. Inspections and Tests

25.1 The Purchaser or its representative shall have the right to inspect and/or test any components of the System, as specified in the Technical Requirements, to confirm their good working order and/or conformity to the Contract at the point of delivery and/or at the Project Site.

25.2 The Purchaser or its representative shall be entitled to attend any such inspections and/or tests of the components, provided that the Purchaser shall bear all costs and expenses incurred in connection with such attendance, including but not limited to all inspection agent fees, travel, and related expenses.

25.3 Should the inspected or tested components fail to conform to the Contract, the Purchaser may reject the component(s), and the Supplier shall either replace the rejected component(s), or make alterations as necessary so that it meets the Contract requirements free of cost to the Purchaser.

25.4 The Project Manager may require the Supplier to carry out any inspection and/or test not specified in the Contract, provided that the Supplier's reasonable costs and expenses incurred in the carrying out of such inspection and/or test shall be added to the Contract Price. Further, if such inspection and/or test impedes the progress of work on the System and/or the Supplier's performance of its other obligations under the Contract, due allowance will be made in respect of the Time for Achieving Operational Acceptance and the other obligations so affected.

25.5 If any dispute shall arise between the parties in connection with or caused by an inspection and/or with regard to any component to be incorporated in the System that cannot be settled amicably between the parties within a reasonable period of time, either party may invoke the process pursuant to GCC Clause 6 (Settlement of Disputes), starting with referral of the matter to the Adjudicator in case an Adjudicator is included and named in the Contract Agreement.

26. Installation of the System

26.1 As soon as the System, or any Subsystem, has, in the opinion of the Supplier, been delivered, Pre-commissioned, and made ready for Commissioning and Operational Acceptance Testing in accordance with the Technical Requirements, the SCC and the Agreed and Finalized Project Plan, the Supplier shall so notify the Purchaser in writing.

26.2 The Project Manager shall, within fourteen (14) days after receipt of the Supplier's notice under GCC Clause 26.1, either issue an Installation Certificate in the form specified in the Sample Forms Section in the Bidding Documents, stating

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that the System, or major component or Subsystem (if Acceptance by major component or Subsystem is specified pursuant to the SCC for GCC Clause 27.2.1), has achieved Installation by the date of the Supplier's notice under GCC Clause 26.1, or notify the Supplier in writing of any defects and/or deficiencies, including, but not limited to, defects or deficiencies in the interoperability or integration of the various components and/or Subsystems making up the System. The Supplier shall use all reasonable endeavors to promptly remedy any defect and/or deficiencies that the Project Manager has notified the Supplier of. The Supplier shall then promptly carry out retesting of the System or Subsystem and, when in the Supplier's opinion the System or Subsystem is ready for Commissioning and Operational Acceptance Testing, notify the Purchaser in writing, in accordance with GCC Clause 26.1. The procedure set out in this GCC Clause 26.2 shall be repeated, as necessary, until an Installation Certificate is issued.

26.3 If the Project Manager fails to issue the Installation Certificate and fails to inform the Supplier of any defects and/or deficiencies within fourteen (14) days after receipt of the Supplier's notice under GCC Clause 26.1, or if the Purchaser puts the System or a Subsystem into production operation, then the System (or Subsystem) shall be deemed to have achieved successful Installation as of the date of the Supplier's notice or repeated notice, or when the Purchaser put the System into production operation, as the case may be.

27. Commissioning and Operational Acceptance

27.1 Commissioning

27.1.1 Commissioning of the System (or Subsystem if specified pursuant to the SCC for GCC Clause 27.2.1) shall be commenced by the Supplier:

(a) immediately after the Installation Certificate is issued by the Project Manager, pursuant to GCC Clause 26.2; or

(b) as otherwise specified in the Technical Requirement or the Agreed and Finalized Project Plan; or

(c) immediately after Installation is deemed to have occurred, under GCC Clause 26.3.

27.1.2 The Purchaser shall supply the operating and technical personnel and all materials and information reasonably required to enable the Supplier to carry out its obligations with respect to Commissioning.

Production use of the System or Subsystem(s) shall

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not commence prior to the start of formal Operational Acceptance Testing.

27.2 Operational Acceptance Tests

27.2.1 The Operational Acceptance Tests (and repeats of such tests) shall be the primary responsibility of the Purchaser (in accordance with GCC Clause 10.9), but shall be conducted with the full cooperation of the Supplier during Commissioning of the System (or major components or Subsystem[s] if **specified in the SCC** and supported by the Technical Requirements), to ascertain whether the System (or major component or Subsystem[s]) conforms to the Technical Requirements and meets the standard of performance quoted in the Supplier's bid, including, but not restricted to, the functional and technical performance requirements. The Operational Acceptance Tests during Commissioning will be conducted as **specified in the SCC,** the Technical Requirements and/or the Agreed and Finalized Project Plan.

At the Purchaser's discretion, Operational Acceptance Tests may also be performed on replacement Goods, upgrades and new version releases, and Goods that are added or field-modified after Operational Acceptance of the System.

27.2.2 If for reasons attributable to the Purchaser, the Operational Acceptance Test of the System (or Subsystem[s] or major components, pursuant to the SCC for GCC Clause 27.2.1) cannot be successfully completed within the period **specified in the SCC,** from the date of Installation or any other period agreed upon in writing by the Purchaser and the Supplier, the Supplier shall be deemed to have fulfilled its obligations with respect to the technical and functional aspects of the Technical Specifications, SCC and/or the Agreed and Finalized Project Plan, and GCC Clause 28.2 and 28.3 shall not apply.

27.3 Operational Acceptance

27.3.1 Subject to GCC Clause 27.4 (Partial Acceptance) below, Operational Acceptance shall occur in respect of the System, when

(a) the Operational Acceptance Tests, as specified in the Technical Requirements, and/or SCC and/or the Agreed and Finalized Project Plan have been successfully completed; or

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(b) the Operational Acceptance Tests have not been successfully completed or have not been carried out for reasons that are attributable to the Purchaser within the period from the date of Installation or any other agreed-upon period as specified in GCC Clause 27.2.2 above; or

(c) the Purchaser has put the System into production or use for sixty (60) consecutive days. If the System is put into production or use in this manner, the Supplier shall notify the Purchaser and document such use.

27.3.2 At any time after any of the events set out in GCC Clause 27.3.1 have occurred, the Supplier may give a notice to the Project Manager requesting the issue of an Operational Acceptance Certificate.

27.3.3 After consultation with the Purchaser, and within fourteen (14) days after receipt of the Supplier's notice, the Project Manager shall:

(a) issue an Operational Acceptance Certificate; or

(b) notify the Supplier in writing of any defect or deficiencies or other reason for the failure of the Operational Acceptance Tests; or

(c) issue the Operational Acceptance Certificate, if the situation covered by GCC Clause 27.3.1 (b) arises.

27.3.4 The Supplier shall use all reasonable endeavors to promptly remedy any defect and/or deficiencies and/or other reasons for the failure of the Operational Acceptance Test that the Project Manager has notified the Supplier of. Once such remedies have been made by the Supplier, the Supplier shall notify the Purchaser, and the Purchaser, with the full cooperation of the Supplier, shall use all reasonable endeavors to promptly carry out retesting of the System or Subsystem. Upon the successful conclusion of the Operational Acceptance Tests, the Supplier shall notify the Purchaser of its request for Operational Acceptance Certification, in accordance with GCC Clause 27.3.3. The Purchaser shall then issue to the Supplier the Operational Acceptance Certification in accordance with GCC Clause 27.3.3 (a), or shall notify the Supplier of further defects, deficiencies, or other reasons for the failure of the Operational Acceptance Test. The procedure set out in this GCC Clause 27.3.4 shall be repeated, as necessary, until an

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Operational Acceptance Certificate is issued.

27.3.5 If the System or Subsystem fails to pass the Operational Acceptance Test(s) in accordance with GCC Clause 27.2, then either:

(a) the Purchaser may consider terminating the Contract, pursuant to GCC Clause 41.2.2;

or

(b) if the failure to achieve Operational Acceptance within the specified time period is a result of the failure of the Purchaser to fulfill its obligations under the Contract, then the Supplier shall be deemed to have fulfilled its obligations with respect to the relevant technical and functional aspects of the Contract, and GCC Clauses 30.3 and 30.4 shall not apply.

27.3.6 If within fourteen (14) days after receipt of the Supplier's notice the Project Manager fails to issue the Operational Acceptance Certificate or fails to inform the Supplier in writing of the justifiable reasons why the Project Manager has not issued the Operational Acceptance Certificate, the System or Subsystem shall be deemed to have been accepted as of the date of the Supplier's said notice.

27.4 Partial Acceptance

27.4.1 If so specified in the SCC for GCC Clause 27.2.1, Installation and Commissioning shall be carried out individually for each identified major component or Subsystem(s) of the System. In this event, the provisions in the Contract relating to Installation and Commissioning, including the Operational Acceptance Test, shall apply to each such major component or Subsystem individually, and Operational Acceptance Certificate(s) shall be issued accordingly for each such major component or Subsystem of the System, subject to the limitations contained in GCC Clause 27.4.2.

27.4.2 The issuance of Operational Acceptance Certificates for individual major components or Subsystems pursuant to GCC Clause 27.4.1 shall not relieve the Supplier of its obligation to obtain an Operational Acceptance Certificate for the System as an integrated whole (if so specified in the SCC for GCC Clauses 12.1 and 27.2.1) once all major components and Subsystems have been supplied, installed, tested, and commissioned.

27.4.3 In the case of minor components for the System that

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by their nature do not require Commissioning or an Operational Acceptance Test (e.g., minor fittings, furnishings or site works, etc.), the Project Manager shall issue an Operational Acceptance Certificate within fourteen (14) days after the fittings and/or furnishings have been delivered and/or installed or the site works have been completed. The Supplier shall, however, use all reasonable endeavors to promptly remedy any defects or deficiencies in such minor components detected by the Purchaser or Supplier.

F. GUARANTEES AND LIABILITIES

28. Operational Acceptance Time Guarantee

28.1 The Supplier guarantees that it shall complete the supply, Installation, Commissioning, and achieve Operational Acceptance of the System (or Subsystems, pursuant to the SCC for GCC Clause 27.2.1) within the time periods specified in the Implementation Schedule in the Technical Requirements Section and/or the Agreed and Finalized Project Plan pursuant to GCC Clause 8.2, or within such extended time to which the Supplier shall be entitled under GCC Clause 40 (Extension of Time for Achieving Operational Acceptance).

28.2 If the Supplier fails to supply, install, commission, and achieve Operational Acceptance of the System (or Subsystems pursuant to the SCC for GCC Clause 27.2.1) within the time for achieving Operational Acceptance specified in the Implementation Schedule in the Technical Requirement or the Agreed and Finalized Project Plan, or any extension of the time for achieving Operational Acceptance previously granted under GCC Clause 40 (Extension of Time for Achieving Operational Acceptance), the Supplier shall pay to the Purchaser liquidated damages at the rate **specified in the SCC** as a percentage of the Contract Price, or the relevant part of the Contract Price if a Subsystem has not achieved Operational Acceptance. The aggregate amount of such liquidated damages shall in no event exceed the amount specified in the SCC ("the Maximum"). Once the Maximum is reached, the Purchaser may consider termination of the Contract, pursuant to GCC Clause 41.2.2.

28.3 Unless otherwise **specified in the SCC,** liquidated damages payable under GCC Clause 28.2 shall apply only to the failure to achieve Operational Acceptance of the System (and Subsystems) as specified in the Implementation Schedule in the Technical Requirements and/or Agreed and Finalized Project Plan. This Clause 28.3 shall not limit, however, any other rights or remedies the Purchaser may have under the Contract for other delays.

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28.4 If liquidated damages are claimed by the Purchaser for the System (or Subsystem), the Supplier shall have no further liability whatsoever to the Purchaser in respect to the Operational Acceptance time guarantee for the System (or Subsystem). However, the payment of liquidated damages shall not in any way relieve the Supplier from any of its obligations to complete the System or from any other of its obligations and liabilities under the Contract.

29. Defect Liability

29.1 The Supplier warrants that the System, including all Information Technologies, Materials, and other Goods supplied and Services provided, shall be free from defects in the design, engineering, Materials, and workmanship that prevent the System and/or any of its components from fulfilling the Technical Requirements or that limit in a material fashion the performance, reliability, or extensibility of the System and/or Subsystems. Exceptions and/or limitations, if any, to this warranty with respect to Software (or categories of Software), shall be as **specified in the SCC.** Commercial warranty provisions of products supplied under the Contract shall apply to the extent that they do not conflict with the provisions of this Contract.

29.2 The Supplier also warrants that the Information Technologies, Materials, and other Goods supplied under the Contract are new, unused, and incorporate all recent improvements in design that materially affect the System's or Subsystem's ability to fulfill the Technical Requirements.

29.3 In addition, the Supplier warrants that: (i) all Goods components to be incorporated into the System form part of the Supplier's and/or Subcontractor's current product lines, (ii) they have been previously released to the market, and (iii) those specific items **identified in the SCC** (if any) have been in the market for at least the minimum periods **specified in the SCC.**

29.4 The Warranty Period shall commence from the date of Operational Acceptance of the System (or of any major component or Subsystem for which separate Operational Acceptance is provided for in the Contract) and shall extend for the length of time **specified in the SCC.**

29.5 If during the Warranty Period any defect as described in GCC Clause 29.1 should be found in the design, engineering, Materials, and workmanship of the Information Technologies and other Goods supplied or of the Services provided by the Supplier, the Supplier shall promptly, in consultation and agreement with the Purchaser regarding appropriate remedying of the defects, and at its sole cost, repair, replace, or otherwise make good (as the Supplier

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shall, at its discretion, determine) such defect as well as any damage to the System caused by such defect. Any defective Information Technologies or other Goods that have been replaced by the Supplier shall remain the property of the Supplier.

29.6 The Supplier shall not be responsible for the repair, replacement, or making good of any defect or of any damage to the System arising out of or resulting from any of the following causes:

(a) improper operation or maintenance of the System by the Purchaser;

(b) normal wear and tear;

(c) use of the System with items not supplied by the Supplier, unless otherwise identified in the Technical Requirements, or approved by the Supplier; or

(d) modifications made to the System by the Purchaser, or a third party, not approved by the Supplier.

29.7 The Supplier's obligations under this GCC Clause 29 shall not apply to:

(a) any materials that are normally consumed in operation or have a normal life shorter than the Warranty Period; or

(b) any designs, specifications, or other data designed, supplied, or specified by or on behalf of the Purchaser or any matters for which the Supplier has disclaimed responsibility, in accordance with GCC Clause 21.1.2.

29.8 The Purchaser shall give the Supplier a notice promptly following the discovery of such defect, stating the nature of any such defect together with all available evidence. The Purchaser shall afford all reasonable opportunity for the Supplier to inspect any such defect. The Purchaser shall afford the Supplier all necessary access to the System and the site to enable the Supplier to perform its obligations under this GCC Clause 29.

29.9 The Supplier may, with the consent of the Purchaser, remove from the site any Information Technologies and other Goods that are defective, if the nature of the defect, and/or any damage to the System caused by the defect, is such that repairs cannot be expeditiously carried out at the site. If the repair, replacement, or making good is of such a character that it may affect the efficiency of the System, the Purchaser may give the Supplier notice requiring that tests of the defective part be made by the Supplier immediately upon completion of such remedial work, whereupon the Supplier

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shall carry out such tests.

If such part fails the tests, the Supplier shall carry out further repair, replacement, or making good (as the case may be) until that part of the System passes such tests. The tests shall be agreed upon by the Purchaser and the Supplier.

29.10 If the Supplier fails to commence the work necessary to remedy such defect or any damage to the System caused by such defect within the time period **specified in the SCC,** the Purchaser may, following notice to the Supplier, proceed to do such work or contract a third party (or parties) to do such work, and the reasonable costs incurred by the Purchaser in connection with such work shall be paid to the Purchaser by the Supplier or may be deducted by the Purchaser from any monies due the Supplier or claimed under the Performance Security.

29.11 If the System or Subsystem cannot be used by reason of such defect and/or making good of such defect, the Warranty Period for the System shall be extended by a period equal to the period during which the System or Subsystem could not be used by the Purchaser because of such defect and/or making good of such defect.

29.12 Items substituted for defective parts of the System during the Warranty Period shall be covered by the Defect Liability Warranty for the remainder of the Warranty Period applicable for the part replaced or three (3) months, whichever is greater.

29.13 At the request of the Purchaser and without prejudice to any other rights and remedies that the Purchaser may have against the Supplier under the Contract, the Supplier will offer all possible assistance to the Purchaser to seek warranty services or remedial action from any subcontracted third-party producers or licensor of Goods included in the System, including without limitation assignment or transfer in favor of the Purchaser of the benefit of any warranties given by such producers or licensors to the Supplier.

30. Functional Guarantees

30.1 The Supplier guarantees that, once the Operational Acceptance Certificate(s) has been issued, the System represents a complete, integrated solution to the Purchaser's requirements set forth in the Technical Requirements and it conforms to all other aspects of the Contract. The Supplier acknowledges that GCC Clause 27 regarding Commissioning and Operational Acceptance governs how technical conformance of the System to the Contract requirements will be determined.

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30.2 If, for reasons attributable to the Supplier, the System does not conform to the Technical Requirements or does not conform to all other aspects of the Contract, the Supplier shall at its cost and expense make such changes, modifications, and/or additions to the System as may be necessary to conform to the Technical Requirements and meet all functional and performance standards. The Supplier shall notify the Purchaser upon completion of the necessary changes, modifications, and/or additions and shall request the Purchaser to repeat the Operational Acceptance Tests until the System achieves Operational Acceptance.

30.3 If the System (or Subsystem[s]) fails to achieve Operational Acceptance, the Purchaser may consider termination of the Contract, pursuant to GCC Clause 41.2.2, and forfeiture of the Supplier's Performance Security in accordance with GCC Clause 13.3 in compensation for the extra costs and delays likely to result from this failure.

31. Intellectual Property Rights Warranty

31.1 The Supplier hereby represents and warrants that:

(a) the System as supplied, installed, tested, and accepted;

(b) use of the System in accordance with the Contract; and

(c) copying of the Software and Materials provided to the Purchaser in accordance with the Contract

do not and will not infringe any Intellectual Property Rights held by any third party and that it has all necessary rights or at its sole expense shall have secured in writing all transfers of rights and other consents necessary to make the assignments, licenses, and other transfers of Intellectual Property Rights and the warranties set forth in the Contract, and for the Purchaser to own or exercise all Intellectual Property Rights as provided in the Contract. Without limitation, the Supplier shall secure all necessary written agreements, consents, and transfers of rights from its employees and other persons or entities whose services are used for development of the System.

32. Intellectual Property Rights Indemnity

32.1 The Supplier shall indemnify and hold harmless the Purchaser and its employees and officers from and against any and all losses, liabilities, and costs (including losses, liabilities, and costs incurred in defending a claim alleging such a liability), that the Purchaser or its employees or officers may suffer as a result of any infringement or alleged infringement of any Intellectual Property Rights by reason of:

(a) installation of the System by the Supplier or the use of the System, including the Materials, in the country

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where the site is located;

(b) copying of the Software and Materials provided the Supplier in accordance with the Agreement; and

(c) sale of the products produced by the System in any country, except to the extent that such losses, liabilities, and costs arise as a result of the Purchaser's breach of GCC Clause 32.2.

32.2 Such indemnity shall not cover any use of the System, including the Materials, other than for the purpose indicated by or to be reasonably inferred from the Contract, any infringement resulting from the use of the System, or any products of the System produced thereby in association or combination with any other goods or services not supplied by the Supplier, where the infringement arises because of such association or combination and not because of use of the System in its own right.

32.3 Such indemnities shall also not apply if any claim of infringement:

(a) is asserted by a parent, subsidiary, or affiliate of the Purchaser's organization;

(b) is a direct result of a design mandated by the Purchaser's Technical Requirements and the possibility of such infringement was duly noted in the Supplier's Bid; or

(c) results from the alteration of the System, including the Materials, by the Purchaser or any persons other than the Supplier or a person authorized by the Supplier.

32.4 If any proceedings are brought or any claim is made against the Purchaser arising out of the matters referred to in GCC Clause 32.1, the Purchaser shall promptly give the Supplier notice of such proceedings or claims, and the Supplier may at its own expense and in the Purchaser's name conduct such proceedings or claim and any negotiations for the settlement of any such proceedings or claim.

If the Supplier fails to notify the Purchaser within twenty-eight (28) days after receipt of such notice that it intends to conduct any such proceedings or claim, then the Purchaser shall be free to conduct the same on its own behalf. Unless the Supplier has so failed to notify the Purchaser within the twenty-eight (28) days, the Purchaser shall make no admission that may be prejudicial to the defense of any such proceedings or claim. The Purchaser shall, at the Supplier's request, afford all available assistance to the Supplier in

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conducting such proceedings or claim and shall be reimbursed by the Supplier for all reasonable expenses incurred in so doing.

32.5 The Purchaser shall indemnify and hold harmless the Supplier and its employees, officers, and Subcontractors from and against any and all losses, liabilities, and costs (including losses, liabilities, and costs incurred in defending a claim alleging such a liability) that the Supplier or its employees, officers, or Subcontractors may suffer as a result of any infringement or alleged infringement of any Intellectual Property Rights arising out of or in connection with any design, data, drawing, specification, or other documents or materials provided to the Supplier in connection with this Contract by the Purchaser or any persons (other than the Supplier) contracted by the Purchaser, except to the extent that such losses, liabilities, and costs arise as a result of the Supplier's breach of GCC Clause 32.8.

32.6 Such indemnity shall not cover

(a) any use of the design, data, drawing, specification, or other documents or materials, other than for the purpose indicated by or to be reasonably inferred from the Contract;

(b) any infringement resulting from the use of the design, data, drawing, specification, or other documents or materials, or any products produced thereby, in association or combination with any other Goods or Services not provided by the Purchaser or any other person contracted by the Purchaser, where the infringement arises because of such association or combination and not because of the use of the design, data, drawing, specification, or other documents or materials in its own right.

32.7 Such indemnities shall also not apply:

(a) if any claim of infringement is asserted by a parent, subsidiary, or affiliate of the Supplier's organization;

(b) to the extent that any claim of infringement is caused by the alteration, by the Supplier, or any persons contracted by the Supplier, of the design, data, drawing, specification, or other documents or materials provided to the Supplier by the Purchaser or any persons contracted by the Purchaser.

32.8 If any proceedings are brought or any claim is made against the Supplier arising out of the matters referred to in GCC

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Clause 32.5, the Supplier shall promptly give the Purchaser notice of such proceedings or claims, and the Purchaser may at its own expense and in the Supplier's name conduct such proceedings or claim and any negotiations for the settlement of any such proceedings or claim. If the Purchaser fails to notify the Supplier within twenty-eight (28) days after receipt of such notice that it intends to conduct any such proceedings or claim, then the Supplier shall be free to conduct the same on its own behalf. Unless the Purchaser has so failed to notify the Supplier within the twenty-eight (28) days, the Supplier shall make no admission that may be prejudicial to the defense of any such proceedings or claim. The Supplier shall, at the Purchaser's request, afford all available assistance to the Purchaser in conducting such proceedings or claim and shall be reimbursed by the Purchaser for all reasonable expenses incurred in so doing.

33. Limitation of Liability

33.1 Provided the following does not exclude or limit any liabilities of either party in ways not permitted by applicable law:

(a) the Supplier shall not be liable to the Purchaser, whether in contract, tort, or otherwise, for any indirect or consequential loss or damage, loss of use, loss of production, or loss of profits or interest costs, provided that this exclusion shall not apply to any obligation of the Supplier to pay liquidated damages to the Purchaser; and

(b) the aggregate liability of the Supplier to the Purchaser, whether under the Contract, in tort or otherwise, shall not exceed the total Contract Price, provided that this limitation shall not apply to any obligation of the Supplier to indemnify the Purchaser with respect to intellectual property rights infringement.

G. Risk Distribution

34. Transfer of Ownership

34.1 With the exception of Software and Materials, the ownership of the Information Technologies and other Goods shall be transferred to the Purchaser at the time of Delivery or otherwise under terms that may be agreed upon and specified in the Contract Agreement.

34.2 Ownership and the terms of usage of the Software and Materials supplied under the Contract shall be governed by GCC Clause 15 (Copyright) and any elaboration in the Technical Requirements.

34.3 Ownership of the Supplier's Equipment used by the Supplier

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and its Subcontractors in connection with the Contract shall remain with the Supplier or its Subcontractors.

35. Care of the System

35.1 The Purchaser shall become responsible for the care and custody of the System or Subsystems upon their Delivery. The Purchaser shall make good at its own cost any loss or damage that may occur to the System or Subsystems from any cause from the date of Delivery until the date of Operational Acceptance of the System or Subsystems, pursuant to GCC Clause 27 (Commissioning and Operational Acceptance), excepting such loss or damage arising from acts or omissions of the Supplier, its employees, or subcontractors.

35.2 If any loss or damage occurs to the System or any part of the System by reason of:

(a) (insofar as they relate to the country where the Project Site is located) nuclear reaction, nuclear radiation, radioactive contamination, a pressure wave caused by aircraft or other aerial objects, or any other occurrences that an experienced contractor could not reasonably foresee, or if reasonably foreseeable could not reasonably make provision for or insure against, insofar as such risks are not normally insurable on the insurance market and are mentioned in the general exclusions of the policy of insurance taken out under GCC Clause 37;

(b) any use not in accordance with the Contract, by the Purchaser or any third party;

(c) any use of or reliance upon any design, data, or specification provided or designated by or on behalf of the Purchaser, or any such matter for which the Supplier has disclaimed responsibility in accordance with GCC Clause 21.1.2,

the Purchaser shall pay to the Supplier all sums payable in respect of the System or Subsystems that have achieved Operational Acceptance, notwithstanding that the same be lost, destroyed, or damaged. If the Purchaser requests the Supplier in writing to make good any loss or damage to the System thereby occasioned, the Supplier shall make good the same at the cost of the Purchaser in accordance with GCC Clause 39. If the Purchaser does not request the Supplier in writing to make good any loss or damage to the System thereby occasioned, the Purchaser shall either request a change in accordance with GCC Clause 39, excluding the performance of that part of the System thereby lost, destroyed, or damaged, or, where the loss or damage affects

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a substantial part of the System, the Purchaser shall terminate the Contract pursuant to GCC Clause 41.1.

35.3 The Purchaser shall be liable for any loss of or damage to any Supplier's Equipment which the Purchaser has authorized to locate within the Purchaser's premises for use in fulfillment of Supplier's obligations under the Contract, except where such loss or damage arises from acts or omissions of the Supplier, its employees, or subcontractors.

36. Loss of or Damage to Property; Accident or Injury to Workers; Indemnification

36.1 The Supplier and each and every Subcontractor shall abide by the job safety, insurance, customs, and immigration measures prevalent and laws in force in the Purchaser's Country.

36.2 Subject to GCC Clause 36.3, the Supplier shall indemnify and hold harmless the Purchaser and its employees and officers from and against any and all losses, liabilities and costs (including losses, liabilities, and costs incurred in defending a claim alleging such a liability) that the Purchaser or its employees or officers may suffer as a result of the death or injury of any person or loss of or damage to any property (other than the System, whether accepted or not) arising in connection with the supply, installation, testing, and Commissioning of the System and by reason of the negligence of the Supplier or its Subcontractors, or their employees, officers or agents, except any injury, death, or property damage caused by the negligence of the Purchaser, its contractors, employees, officers, or agents.

36.3 If any proceedings are brought or any claim is made against the Purchaser that might subject the Supplier to liability under GCC Clause 36.2, the Purchaser shall promptly give the Supplier notice of such proceedings or claims, and the Supplier may at its own expense and in the Purchaser's name conduct such proceedings or claim and any negotiations for the settlement of any such proceedings or claim. If the Supplier fails to notify the Purchaser within twenty-eight (28) days after receipt of such notice that it intends to conduct any such proceedings or claim, then the Purchaser shall be free to conduct the same on its own behalf. Unless the Supplier has so failed to notify the Purchaser within the twenty-eight (28) day period, the Purchaser shall make no admission that may be prejudicial to the defense of any such proceedings or claim. The Purchaser shall, at the Supplier's request, afford all available assistance to the Supplier in conducting such proceedings or claim and shall be reimbursed by the Supplier for all reasonable expenses incurred in so doing.

36.4 The Purchaser shall indemnify and hold harmless the

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Supplier and its employees, officers, and Subcontractors from any and all losses, liabilities, and costs (including losses, liabilities, and costs incurred in defending a claim alleging such a liability) that the Supplier or its employees, officers, or Subcontractors may suffer as a result of the death or personal injury of any person or loss of or damage to property of the Purchaser, other than the System not yet achieving Operational Acceptance, that is caused by fire, explosion, or any other perils, in excess of the amount recoverable from insurances procured under GCC Clause 37 (Insurances), provided that such fire, explosion, or other perils were not caused by any act or failure of the Supplier.

36.5 If any proceedings are brought or any claim is made against the Supplier that might subject the Purchaser to liability under GCC Clause 36.4, the Supplier shall promptly give the Purchaser notice of such proceedings or claims, and the Purchaser may at its own expense and in the Supplier's name conduct such proceedings or claim and any negotiations for the settlement of any such proceedings or claim. If the Purchaser fails to notify the Supplier within twenty-eight (28) days after receipt of such notice that it intends to conduct any such proceedings or claim, then the Supplier shall be free to conduct the same on its own behalf. Unless the Purchaser has so failed to notify the Supplier within the twenty-eight (28) days, the Supplier shall make no admission that may be prejudicial to the defense of any such proceedings or claim. The Supplier shall, at the Purchaser's request, afford all available assistance to the Purchaser in conducting such proceedings or claim and shall be reimbursed by the Purchaser for all reasonable expenses incurred in so doing.

36.6 The party entitled to the benefit of an indemnity under this GCC Clause 36 shall take all reasonable measures to mitigate any loss or damage that has occurred. If the party fails to take such measures, the other party's liabilities shall be correspondingly reduced.

37. Insurances

37.1 The Supplier shall at its expense take out and maintain in effect, or cause to be taken out and maintained in effect, during the performance of the Contract, the insurance set forth below. The identity of the insurers and the form of the policies shall be subject to the approval of the Purchaser, who should not unreasonably withhold such approval.

(a) Cargo Insurance During Transport

as applicable, 110 percent of the price of the Information Technologies and other Goods in a freely convertible currency, covering the Goods from

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physical loss or damage during shipment through receipt at the Project Site.

(b) Installation "All Risks" Insurance

as applicable, 110 percent of the price of the Information Technologies and other Goods covering the Goods at the site from all risks of physical loss or damage (excluding only perils commonly excluded under "all risks" insurance policies of this type by reputable insurers) occurring prior to Operational Acceptance of the System.

(c) Third-Party Liability Insurance

On terms as **specified in the SCC,** covering bodily injury or death suffered by third parties (including the Purchaser's personnel) and loss of or damage to property (including the Purchaser's property and any Subsystems that have been accepted by the Purchaser) occurring in connection with the supply and installation of the Information System.

(d) Automobile Liability Insurance

In accordance with the statutory requirements prevailing in the Purchaser's Country, covering use of all vehicles used by the Supplier or its Subcontractors (whether or not owned by them) in connection with the execution of the Contract.

(e) Other Insurance (if any), as **specified in the SCC.**

37.2 The Purchaser shall be named as co-insured under all insurance policies taken out by the Supplier pursuant to GCC Clause 37.1, except for the Third-Party Liability, and the Supplier's Subcontractors shall be named as co-insured under all insurance policies taken out by the Supplier pursuant to GCC Clause 37.1 except for Cargo Insurance During Transport. All insurer's rights of subrogation against such co-insured for losses or claims arising out of the performance of the Contract shall be waived under such policies.

37.3 The Supplier shall deliver to the Purchaser certificates of insurance (or copies of the insurance policies) as evidence that the required policies are in full force and effect.

37.4 The Supplier shall ensure that, where applicable, its Subcontractor(s) shall take out and maintain in effect adequate insurance policies for their personnel and vehicles and for work executed by them under the Contract, unless such Subcontractors are covered by the policies taken out by

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the Supplier.

37.5 If the Supplier fails to take out and/or maintain in effect the insurance referred to in GCC Clause 37.1, the Purchaser may take out and maintain in effect any such insurance and may from time to time deduct from any amount due the Supplier under the Contract any premium that the Purchaser shall have paid to the insurer or may otherwise recover such amount as a debt due from the Supplier.

37.6 Unless otherwise provided in the Contract, the Supplier shall prepare and conduct all and any claims made under the policies effected by it pursuant to this GCC Clause 37, and all monies payable by any insurers shall be paid to the Supplier. The Purchaser shall give to the Supplier all such reasonable assistance as may be required by the Supplier in connection with any claim under the relevant insurance policies. With respect to insurance claims in which the Purchaser's interest is involved, the Supplier shall not give any release or make any compromise with the insurer without the prior written consent of the Purchaser. With respect to insurance claims in which the Supplier's interest is involved, the Purchaser shall not give any release or make any compromise with the insurer without the prior written consent of the Supplier.

38. Force Majeure

38.1 "Force Majeure" shall mean any event beyond the reasonable control of the Purchaser or of the Supplier, as the case may be, and which is unavoidable notwithstanding the reasonable care of the party affected and shall include, without limitation, the following:

(a) war, hostilities, or warlike operations (whether a state of war be declared or not), invasion, act of foreign enemy, and civil war;

(b) rebellion, revolution, insurrection, mutiny, usurpation of civil or military government, conspiracy, riot, civil commotion, and terrorist acts;

(c) confiscation, nationalization, mobilization, commandeering or requisition by or under the order of any government or de jure or de facto authority or ruler, or any other act or failure to act of any local state or national government authority;

(d) strike, sabotage, lockout, embargo, import restriction, port congestion, lack of usual means of public transportation and communication, industrial dispute, shipwreck, shortage or restriction of power supply, epidemics, quarantine, and plague;

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(e) earthquake, landslide, volcanic activity, fire, flood or inundation, tidal wave, typhoon or cyclone, hurricane, storm, lightning, or other inclement weather condition, nuclear and pressure waves, or other natural or physical disaster;

(f) failure, by the Supplier, to obtain the necessary export permit(s) from the governments of the Country(s) of Origin of the Information Technologies or other Goods, or Supplier's Equipment provided that the Supplier has made all reasonable efforts to obtain the required export permit(s), including the exercise of due diligence in determining the eligibility of the System and all of its components for receipt of the necessary export permits.

38.2 If either party is prevented, hindered, or delayed from or in performing any of its obligations under the Contract by an event of Force Majeure, then it shall notify the other in writing of the occurrence of such event and the circumstances of the event of Force Majeure within fourteen (14) days after the occurrence of such event.

38.3 The party who has given such notice shall be excused from the performance or punctual performance of its obligations under the Contract for so long as the relevant event of Force Majeure continues and to the extent that such party's performance is prevented, hindered, or delayed. The Time for Achieving Operational Acceptance shall be extended in accordance with GCC Clause 40 (Extension of Time for Achieving Operational Acceptance).

38.4 The party or parties affected by the event of Force Majeure shall use reasonable efforts to mitigate the effect of the event of Force Majeure upon its or their performance of the Contract and to fulfill its or their obligations under the Contract, but without prejudice to either party's right to terminate the Contract under GCC Clause 38.6.

38.5 No delay or nonperformance by either party to this Contract caused by the occurrence of any event of Force Majeure shall:

(a) constitute a default or breach of the Contract;

(b) (subject to GCC Clauses 35.2, 38.3, and 38.4) give rise to any claim for damages or additional cost or expense occasioned by the delay or nonperformance,

if, and to the extent that, such delay or nonperformance is caused by the occurrence of an event of Force Majeure.

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38.6 If the performance of the Contract is substantially prevented, hindered, or delayed for a single period of more than sixty (60) days or an aggregate period of more than one hundred and twenty (120) days on account of one or more events of Force Majeure during the time period covered by the Contract, the parties will attempt to develop a mutually satisfactory solution, failing which, either party may terminate the Contract by giving a notice to the other.

38.7 In the event of termination pursuant to GCC Clause 38.6, the rights and obligations of the Purchaser and the Supplier shall be as specified in GCC Clauses 41.1.2 and 41.1.3.

38.8 Notwithstanding GCC Clause 38.5, Force Majeure shall not apply to any obligation of the Purchaser to make payments to the Supplier under this Contract.

H. CHANGE IN CONTRACT ELEMENTS

39. Changes to the System

39.1 Introducing a Change

39.1.1 Subject to GCC Clauses 39.2.5 and 39.2.7, the Purchaser shall have the right to propose, and subsequently require, the Project Manager to order the Supplier from time to time during the performance of the Contract to make any change, modification, addition, or deletion to, in, or from the System (interchangeably called "Change"), provided that such Change falls within the general scope of the System, does not constitute unrelated work, and is technically practicable, taking into account both the state of advancement of the System and the technical compatibility of the Change envisaged with the nature of the System as originally specified in the Contract.

A Change may involve, but is not restricted to, the substitution of updated Information Technologies and related Services in accordance with GCC Clause 23 (Product Upgrades).

39.1.2 The Supplier may from time to time during its performance of the Contract propose to the Purchaser (with a copy to the Project Manager) any Change that the Supplier considers necessary or desirable to improve the quality or efficiency of the System. The Purchaser may at its discretion approve or reject any Change proposed by the Supplier.

39.1.3 Notwithstanding GCC Clauses 39.1.1 and 39.1.2, no

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change made necessary because of any default of the Supplier in the performance of its obligations under the Contract shall be deemed to be a Change, and such change shall not result in any adjustment of the Contract Price or the Time for Achieving Operational Acceptance.

39.1.4 The procedure on how to proceed with and execute Changes is specified in GCC Clauses 39.2 and 39.3, and further details and sample forms are provided in the Sample Forms Section in the Bidding Documents.

39.1.5 Moreover, the Purchaser and Supplier will agree, during development of the Project Plan, to a date prior to the scheduled date for Operational Acceptance, after which the Technical Requirements for the System shall be "frozen." Any Change initiated after this time will be dealt with after Operational Acceptance.

39.2 Changes Originating from Purchaser

39.2.1 If the Purchaser proposes a Change pursuant to GCC Clauses 39.1.1, it shall send to the Supplier a "Request for Change Proposal," requiring the Supplier to prepare and furnish to the Project Manager as soon as reasonably practicable a "Change Proposal," which shall include the following:

(a) brief description of the Change;

(b) impact on the Time for Achieving Operational Acceptance;

(c) detailed estimated cost of the Change;

(d) effect on Functional Guarantees (if any);

(e) effect on any other provisions of the Contract.

39.2.2 Prior to preparing and submitting the "Change Proposal," the Supplier shall submit to the Project Manager an "Change Estimate Proposal," which shall be an estimate of the cost of preparing the Change Proposal, plus a first approximation of the suggested approach and cost for implementing the changes. Upon receipt of the Supplier's Change Estimate Proposal, the Purchaser shall do one of the following:

(a) accept the Supplier's estimate with instructions

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to the Supplier to proceed with the preparation of the Change Proposal;

(b) advise the Supplier of any part of its Change Estimate Proposal that is unacceptable and request the Supplier to review its estimate;

(c) advise the Supplier that the Purchaser does not intend to proceed with the Change.

39.2.3 Upon receipt of the Purchaser's instruction to proceed under GCC Clause 39.2.2 (a), the Supplier shall, with proper expedition, proceed with the preparation of the Change Proposal, in accordance with GCC Clause 39.2.1. The Supplier, at its discretion, may specify a validity period for the Change Proposal, after which if the Purchaser and Supplier has not reached agreement in accordance with GCC Clause 39.2.6, then GCC Clause 39.2.7 shall apply.

39.2.4 The pricing of any Change shall, as far as practicable, be calculated in accordance with the rates and prices included in the Contract. If the nature of the Change is such that the Contract rates and prices are inequitable, the parties to the Contract shall agree on other specific rates to be used for valuing the Change.

39.2.5 If before or during the preparation of the Change Proposal it becomes apparent that the aggregate impact of compliance with the Request for Change Proposal and with all other Change Orders that have already become binding upon the Supplier under this GCC Clause 39 would be to increase or decrease the Contract Price as originally set forth in Article 2 (Contract Price) of the Contract Agreement by more than fifteen (15) percent, the Supplier may give a written notice of objection to this Request for Change Proposal prior to furnishing the Change Proposal. If the Purchaser accepts the Supplier's objection, the Purchaser shall withdraw the proposed Change and shall notify the Supplier in writing of its acceptance.

The Supplier's failure to so object to a Request for Change Proposal shall neither affect its right to object to any subsequent requested Changes or Change Orders, nor affect its right to take into account, when making such subsequent objection, the percentage increase or decrease in the Contract

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Price that any Change not objected to by the Supplier represents.

39.2.6 Upon receipt of the Change Proposal, the Purchaser and the Supplier shall mutually agree upon all matters contained in the Change Proposal. Within fourteen (14) days after such agreement, the Purchaser shall, if it intends to proceed with the Change, issue the Supplier a Change Order. If the Purchaser is unable to reach a decision within fourteen (14) days, it shall notify the Supplier with details of when the Supplier can expect a decision. If the Purchaser decides not to proceed with the Change for whatever reason, it shall, within the said period of fourteen (14) days, notify the Supplier accordingly. Under such circumstances, the Supplier shall be entitled to reimbursement of all costs reasonably incurred by it in the preparation of the Change Proposal, provided that these do not exceed the amount given by the Supplier in its Change Estimate Proposal submitted in accordance with GCC Clause 39.2.2.

39.2.7 If the Purchaser and the Supplier cannot reach agreement on the price for the Change, an equitable adjustment to the Time for Achieving Operational Acceptance, or any other matters identified in the Change Proposal, the Change will not be implemented. However, this provision does not limit the rights of either party under GCC Clause 6 (Settlement of Disputes).

39.3 Changes Originating from Supplier

If the Supplier proposes a Change pursuant to GCC Clause 39.1.2, the Supplier shall submit to the Project Manager a written "Application for Change Proposal," giving reasons for the proposed Change and including the information specified in GCC Clause 39.2.1. Upon receipt of the Application for Change Proposal, the parties shall follow the procedures outlined in GCC Clauses 39.2.6 and 39.2.7. However, should the Purchaser choose not to proceed or the Purchaser and the Supplier cannot come to agreement on the change during any validity period that the Supplier may specify in its Application for Change Proposal, the Supplier shall not be entitled to recover the costs of preparing the Application for Change Proposal, unless subject to an agreement between the Purchaser and the Supplier to the contrary.

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40. Extension of Time for Achieving Operational Acceptance

40.1 The time(s) for achieving Operational Acceptance specified in the Schedule of Implementation shall be extended if the Supplier is delayed or impeded in the performance of any of its obligations under the Contract by reason of any of the following:

(a) any Change in the System as provided in GCC Clause 39 (Change in the Information System);

(b) any occurrence of Force Majeure as provided in GCC Clause 38 (Force Majeure);

(c) default of the Purchaser; or

(d) any other matter specifically mentioned in the Contract;

by such period as shall be fair and reasonable in all the circumstances and as shall fairly reflect the delay or impediment sustained by the Supplier.

40.2 Except where otherwise specifically provided in the Contract, the Supplier shall submit to the Project Manager a notice of a claim for an extension of the time for achieving Operational Acceptance, together with particulars of the event or circumstance justifying such extension as soon as reasonably practicable after the commencement of such event or circumstance. As soon as reasonably practicable after receipt of such notice and supporting particulars of the claim, the Purchaser and the Supplier shall agree upon the period of such extension. In the event that the Supplier does not accept the Purchaser's estimate of a fair and reasonable time extension, the Supplier shall be entitled to refer the matter to the provisions for the Settlement of Disputes pursuant to GCC Clause 6.

40.3 The Supplier shall at all times use its reasonable efforts to minimize any delay in the performance of its obligations under the Contract.

41. Termination

41.1 Termination for Purchaser's Convenience

41.1.1 The Purchaser may at any time terminate the Contract for any reason by giving the Supplier a notice of termination that refers to this GCC Clause 41.1.

41.1.2 Upon receipt of the notice of termination under GCC Clause 41.1.1, the Supplier shall either as soon as reasonably practical or upon the date specified in the notice of termination

(a) cease all further work, except for such work as

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the Purchaser may specify in the notice of termination for the sole purpose of protecting that part of the System already executed, or any work required to leave the site in a clean and safe condition;

(b) terminate all subcontracts, except those to be assigned to the Purchaser pursuant to GCC Clause 41.1.2 (d) (ii) below;

(c) remove all Supplier's Equipment from the site, repatriate the Supplier's and its Subcontractors' personnel from the site, remove from the site any wreckage, rubbish, and debris of any kind;

(d) in addition, the Supplier, subject to the payment specified in GCC Clause 41.1.3, shall

(i) deliver to the Purchaser the parts of the System executed by the Supplier up to the date of termination;

(ii) to the extent legally possible, assign to the Purchaser all right, title, and benefit of the Supplier to the System, or Subsystem, as at the date of termination, and, as may be required by the Purchaser, in any subcontracts concluded between the Supplier and its Subcontractors;

(iii) deliver to the Purchaser all nonproprietary drawings, specifications, and other documents prepared by the Supplier or its Subcontractors as of the date of termination in connection with the System.

41.1.3 In the event of termination of the Contract under GCC Clause 41.1.1, the Purchaser shall pay to the Supplier the following amounts:

(a) the Contract Price, properly attributable to the parts of the System executed by the Supplier as of the date of termination;

(b) the costs reasonably incurred by the Supplier in the removal of the Supplier's Equipment from the site and in the repatriation of the Supplier's and its Subcontractors' personnel;

(c) any amount to be paid by the Supplier to its Subcontractors in connection with the termination of any subcontracts, including any

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cancellation charges;

(d) costs incurred by the Supplier in protecting the System and leaving the site in a clean and safe condition pursuant to GCC Clause 41.1.2 (a); and

(e) the cost of satisfying all other obligations, commitments, and claims that the Supplier may in good faith have undertaken with third parties in connection with the Contract and that are not covered by GCC Clauses 41.1.3 (a) through (d) above.

41.2 Termination for Supplier's Default

41.2.1 The Purchaser, without prejudice to any other rights or remedies it may possess, may terminate the Contract forthwith in the following circumstances by giving a notice of termination and its reasons therefore to the Supplier, referring to this GCC Clause 41.2:

(a) if the Supplier becomes bankrupt or insolvent, has a receiving order issued against it, compounds with its creditors, or, if the Supplier is a corporation, a resolution is passed or order is made for its winding up (other than a voluntary liquidation for the purposes of amalgamation or reconstruction), a receiver is appointed over any part of its undertaking or assets, or if the Supplier takes or suffers any other analogous action in consequence of debt;

(b) if the Supplier assigns or transfers the Contract or any right or interest therein in violation of the provision of GCC Clause 42 (Assignment); or

(c) if the Supplier, in the judgment of the Purchaser, has engaged in corrupt, fraudulent, collusive, coercive or obstructive practices, in competing for or in executing the Contract, including but not limited to willful misrepresentation of facts concerning ownership of Intellectual Property Rights in, or proper authorization and/or licenses from the owner to offer, the hardware, software, or materials provided under this Contract.

For the purposes of this Clause:

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(i) "corrupt practice"[1] is the offering, giving, receiving or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party;

(ii) "fraudulent practice"[2] is any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation;

(iii) "collusive practice"[3] is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party;

(iv) "coercive practice"[4] is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;

(v) "obstructive practice"is

(aa) deliberately destroying, falsifying, altering or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede a Bank investigation into allegations of a corrupt, fraudulent, coercive or collusive practice; and/or threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation; or

(bb) acts intended to materially impede the exercise of the Bank's inspection

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1 "Another party" refers to a public official acting in relation to the procurement process or contract execution]. In this context, "public official" includes World Bank staff and employees of other organizations taking or reviewing procurement decisions.

2 A "party" refers to a public official; the terms "benefit" and "obligation" relate to the procurement process or contract execution; and the "act or omission" is intended to influence the procurement process or contract execution.

3 "Parties" refers to participants in the procurement process (including public officials) attempting to establish bid prices at artificial, non competitive levels.

4 A "party" refers to a participant in the procurement process or contract execution.

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and audit rights provided for under Sub-Clause 9.8.

41.2.2 If the Supplier:

(a) has abandoned or repudiated the Contract;

(b) has without valid reason failed to commence work on the System promptly;

(c) persistently fails to execute the Contract in accordance with the Contract or persistently neglects to carry out its obligations under the Contract without just cause;

(d) refuses or is unable to provide sufficient Materials, Services, or labor to execute and complete the System in the manner specified in the Agreed and Finalized Project Plan furnished under GCC Clause 19 at rates of progress that give reasonable assurance to the Purchaser that the Supplier can attain Operational Acceptance of the System by the Time for Achieving Operational Acceptance as extended;

then the Purchaser may, without prejudice to any other rights it may possess under the Contract, give a notice to the Supplier stating the nature of the default and requiring the Supplier to remedy the same. If the Supplier fails to remedy or to take steps to remedy the same within fourteen (14) days of its receipt of such notice, then the Purchaser may terminate the Contract forthwith by giving a notice of termination to the Supplier that refers to this GCC Clause 41.2.

41.2.3 Upon receipt of the notice of termination under GCC Clauses 41.2.1 or 41.2.2, the Supplier shall, either immediately or upon such date as is specified in the notice of termination:

(a) cease all further work, except for such work as the Purchaser may specify in the notice of termination for the sole purpose of protecting that part of the System already executed or any work required to leave the site in a clean and safe condition;

(b) terminate all subcontracts, except those to be assigned to the Purchaser pursuant to GCC Clause 41.2.3 (d) below;

(c) deliver to the Purchaser the parts of the System

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executed by the Supplier up to the date of termination;

(d) to the extent legally possible, assign to the Purchaser all right, title and benefit of the Supplier to the System or Subsystems as at the date of termination, and, as may be required by the Purchaser, in any subcontracts concluded between the Supplier and its Subcontractors;

(e) deliver to the Purchaser all drawings, specifications, and other documents prepared by the Supplier or its Subcontractors as at the date of termination in connection with the System.

41.2.4 The Purchaser may enter upon the site, expel the Supplier, and complete the System itself or by employing any third party. Upon completion of the System or at such earlier date as the Purchaser thinks appropriate, the Purchaser shall give notice to the Supplier that such Supplier's Equipment will be returned to the Supplier at or near the site and shall return such Supplier's Equipment to the Supplier in accordance with such notice. The Supplier shall thereafter without delay and at its cost remove or arrange removal of the same from the site.

41.2.5 Subject to GCC Clause 41.2.6, the Supplier shall be entitled to be paid the Contract Price attributable to the portion of the System executed as at the date of termination and the costs, if any, incurred in protecting the System and in leaving the site in a clean and safe condition pursuant to GCC Clause 41.2.3 (a). Any sums due the Purchaser from the Supplier accruing prior to the date of termination shall be deducted from the amount to be paid to the Supplier under this Contract.

41.2.6 If the Purchaser completes the System, the cost of completing the System by the Purchaser shall be determined. If the sum that the Supplier is entitled to be paid, pursuant to GCC Clause 41.2.5, plus the reasonable costs incurred by the Purchaser in completing the System, exceeds the Contract Price, the Supplier shall be liable for such excess. If such excess is greater than the sums due the Supplier under GCC Clause 41.2.5, the Supplier shall pay the balance to the Purchaser, and if such excess is less than the sums due the Supplier under GCC Clause 41.2.5, the Purchaser shall pay the balance to the Supplier. The Purchaser and the Supplier shall

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agree, in writing, on the computation described above and the manner in which any sums shall be paid.

41.3 Termination by Supplier

41.3.1 If:

(a) the Purchaser has failed to pay the Supplier any sum due under the Contract within the specified period, has failed to approve any invoice or supporting documents without just cause **pursuant to the SCC,** or commits a substantial breach of the Contract, the Supplier may give a notice to the Purchaser that requires payment of such sum, with interest on this sum as stipulated in GCC Clause 12.3, requires approval of such invoice or supporting documents, or specifies the breach and requires the Purchaser to remedy the same, as the case may be. If the Purchaser fails to pay such sum together with such interest, fails to approve such invoice or supporting documents or give its reasons for withholding such approval, fails to remedy the breach or take steps to remedy the breach within fourteen (14) days after receipt of the Supplier's notice; or

(b) the Supplier is unable to carry out any of its obligations under the Contract for any reason attributable to the Purchaser, including but not limited to the Purchaser's failure to provide possession of or access to the site or other areas or failure to obtain any governmental permit necessary for the execution and/or completion of the System;

then the Supplier may give a notice to the Purchaser of such events, and if the Purchaser has failed to pay the outstanding sum, to approve the invoice or supporting documents, to give its reasons for withholding such approval, or to remedy the breach within twenty-eight (28) days of such notice, or if the Supplier is still unable to carry out any of its obligations under the Contract for any reason attributable to the Purchaser within twenty-eight (28) days of the said notice, the Supplier may by a further notice to the Purchaser referring to this GCC Clause 41.3.1, forthwith terminate the Contract.

41.3.2 The Supplier may terminate the Contract immediately by giving a notice to the Purchaser to

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that effect, referring to this GCC Clause 41.3.2, if the Purchaser becomes bankrupt or insolvent, has a receiving order issued against it, compounds with its creditors, or, being a corporation, if a resolution is passed or order is made for its winding up (other than a voluntary liquidation for the purposes of amalgamation or reconstruction), a receiver is appointed over any part of its undertaking or assets, or if the Purchaser takes or suffers any other analogous action in consequence of debt.

41.3.3 If the Contract is terminated under GCC Clauses 41.3.1 or 41.3.2, then the Supplier shall immediately:

(a) cease all further work, except for such work as may be necessary for the purpose of protecting that part of the System already executed, or any work required to leave the site in a clean and safe condition;

(b) terminate all subcontracts, except those to be assigned to the Purchaser pursuant to Clause 41.3.3 (d) (ii);

(c) remove all Supplier's Equipment from the site and repatriate the Supplier's and its Subcontractor's personnel from the site.

(d) In addition, the Supplier, subject to the payment specified in GCC Clause 41.3.4, shall:

(i) deliver to the Purchaser the parts of the System executed by the Supplier up to the date of termination;

(ii) to the extent legally possible, assign to the Purchaser all right, title, and benefit of the Supplier to the System, or Subsystems, as of the date of termination, and, as may be required by the Purchaser, in any subcontracts concluded between the Supplier and its Subcontractors;

(iii) to the extent legally possible, deliver to the Purchaser all drawings, specifications, and other documents prepared by the Supplier or its Subcontractors as of the date of termination in connection with the System.

41.3.4 If the Contract is terminated under GCC Clauses 41.3.1 or 41.3.2, the Purchaser shall pay to

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the Supplier all payments specified in GCC Clause 41.1.3, and reasonable compensation for all loss, except for loss of profit, or damage sustained by the Supplier arising out of, in connection with, or in consequence of such termination.

41.3.5 Termination by the Supplier pursuant to this GCC Clause 41.3 is without prejudice to any other rights or remedies of the Supplier that may be exercised in lieu of or in addition to rights conferred by GCC Clause 41.3.

41.4 In this GCC Clause 41, the expression "portion of the System executed" shall include all work executed, Services provided, and all Information Technologies, or other Goods acquired (or subject to a legally binding obligation to purchase) by the Supplier and used or intended to be used for the purpose of the System, up to and including the date of termination.

41.5 In this GCC Clause 41, in calculating any monies due from the Purchaser to the Supplier, account shall be taken of any sum previously paid by the Purchaser to the Supplier under the Contract, including any advance payment paid **pursuant to the SCC.**

42. Assignment

42.1 Neither the Purchaser nor the Supplier shall, without the express prior written consent of the other, assign to any third party the Contract or any part thereof, or any right, benefit, obligation, or interest therein or thereunder, except that the Supplier shall be entitled to assign either absolutely or by way of charge any monies due and payable to it or that may become due and payable to it under the Contract.

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TECHNICAL REQUIREMENTS (INCLUDING IMPLEMENTATION SCHEDULE)

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Technical Requirements

A. INTRODUCTION

Public Works Department (PWD) plays a major role in the infrastructure development of the State of Kerala. The functions of this Department include construction and maintenance of roads, flyovers, bridges and various types of buildings for Government use. Maintenance of these assets are very important and requires a scientific approach so that the available resources like funds etc are to be utilised appropriately as and when needed. Computerised asset management systems are proposed for effective management of such assets, exchange information about such assets with the Public and other stakeholders, decide the maintenance strategy and proper utilisation of funds for maintenance works etc. Out of the total road network of 1,52,000 KM in the state of Kerala, the PWD maintains 33593 KM of roads comprising of National Highways(NH), State Highways(SH), Major District Roads(MDR) and Other District Roads(ODR).

Even though Kerala PWD have established a GIS based Road Information system and HDM-4 based Road Maintenance Management System(RMMS) way back in 2007, the same could not be used as it was envisaged due to various reasons and are now outdated and redundant. Hence, as part of the revival and upgradation of the existing RMMS systems, the Kerala Public Works Department with the technical assistance of the Central Road Research Institute New Delhi is taking measures to set-up a state of the art road asset management system.

B. OBJECTIVES

The overall objective of the proposed services is to establish an enhanced and user-friendly Web-based Road Information system and Road Maintenance Management System for the State PWD Roads and to ensure that PWD is able to effectively plan and prioritize its road improvement and maintenance works and to prepare realistic proposals for budgetary allocations for road maintenance. This will help to improve the quality and delivery of PWD services in the provision and management of the state road network.

Key objectives of the proposed assignment are to:

(a) Establish a web and GIS based Road Asset Management System for Kerala PWD which is capable of integration with the widely used Pavement Management System– HDM-4(for the core road network and a simple decision tree logic for the non-core road network) and

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thereby to provide readily accessible, relevant and valid information on the state road network, along with analytical tools for use in road maintenance management activities.

(b) Train designated Engineers of the PWD in the use of the above RMMS system

(c) Provide all necessary technical support during implementation, operation & maintenance of the RMMS system.

C. SCOPE OF SERVICES

The broad scope of these services is to:

(a) Supply, configure, host and maintain a commercial well established and time tested, web and GIS-based, state of the art, off the shelf RIS&RMMS system for Kerala PWD(with all necessary supporting software installations), that would produce customized reports and data for informed decision making at the headquarters and other field level offices, and facilitate data entry and HDM-4 analysis (for the core road network and a simple decision tree logic for the non-core road network) as per the specific requirements of the Department.

(b) Supply, configure, host and maintain a Mobile application for both the android and i-os system which works on the above mentioned RIS & RMMS system framework and database for Kerala PWD (with all necessary supporting software installations), that would be used by the general public to get information on the PWD road assets and to submit feedbacks/grievances/complaints using web GIS facilities.

(c) Review the data collection procedures based on requirements of RMMS system, HDM-4 analysis and other MIS reporting and analysis requirements of the Department and to supply, configure, host and maintain custom made web based Smartphone apps(both in android and i-OS) to collect field data together with its storage and integration with the central RMMS server.

(d) Provide licenses and associated costs for AMC during the first 5-year period for all the proposed technologies and third party software used for application/database/GIS map/Web servers and all associated middleware together with all cost for the complete maintenance and upkeep of the whole system established under this contract.

(e) Provide all necessary technical support for the installation and hosting of the RMMS software system and mobile app support systems in the designated Data Centre installation (State owned having internal cloud infrastructure) or at a central facility as directed by the Department including installation of all necessary supporting software systems for

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cyber-security compliances and database management. Advise the Department on the suitability of the existing (or proposed) IT infrastructure for hosting and accessing the RMMS and impart necessary technical advice for the procurement of any additional hardware infrastructure required if any for the efficient working of the RMMS system.

(f) Provide all technical assistance for integrating and harmonising the RMMS system and HDM-4 software(Department shall procure the HDM-4 software separately) and render necessary help(RMMS software related) in determining the annual maintenance needs for roads and help prepare

(g) annual work programs (AWP) and multiyear rolling work programs based on plan and non-plan budgets for network improvement and Annual Maintenance Plans (AMP) containing the identified needs based on the budget allocation

(h) Provide necessary training to the designated departmental staff in the software systems established both in terms of its functioning, usage and administration and to establish a sustainable arrangement for continuance of training for an agreed time as per an agreed schedule.

In line with the above objectives, the Supplier shall undertake the following tasks towards establishing state-of-the-art RIS&RMMS system for Kerala PWD

3.1 Task-1 - Supply, configure, host and maintain a commercial well established and time tested , web and GIS-based ,state of the art ,off the shelf RIS & RMMS system

3.1.1 The RIS&RMMS shall be such that it can be accessed by any standard web browser on any operating system. Hence, the architecture of the system shall be a web based one. The Supplier shall submit the entire architecture of the system together with all supporting software systems (including that of other vendors or developers). **The supporting software systems like web servers, GIS servers, database management systems etc shall preferably be based on open source platform.**

3.1.2 The RIS&RMMS shall be such that, its modules and outputs can be easily customisable or modifiable at any stage. The Supplier shall use their own infrastructure and human resources for any subsequent customisations and modifications required in their commercial off the shelf (COTS) RIS & RMMS system as per the departmental needs at no extra cost during the configuration and hosting proces

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3.1.3 The RIS&RMMS system shall be such that, it shall be capable of exchanging data and information in the required format to other software systems of Kerala PWD like PRICE software, WINGS portal etc upon request from such systems through web service using proper user authorisations and control. The Supplier shall use his own infrastructure and human resources for any subsequent customisations and modifications required in this regard at no extra cost.

3.1.4 The RIS & RMMS system shall consists of the following key modules/sub-systems apart from system administration and corresponding database

3.1.4.1 Road Information System (RIS)

3.1.4.2 Traffic Information System (TIS)

3.1.4.3 Input files creation for use of HDM-4 Pavement Management System. HDM-4 will be used for the core road networks. For the non-core road network a lower standard of data collection and simple decision tree logic is to be used.

3.1.4.4 Road Maintenance Management System (RMMS)

3.1.4.5 Bridge and culvert Information System

3.1.5 The RIS&RMMS system shall be capable of importing and analysing asset inventory and condition data collected from using various standard data collection processes like automated road survey vehicle, FWD etc. The Supplier shall ensure this and shall take measures to solve any issues which may come-up at a later date through appropriate interventions with departmental officers and RMMS Consultant.

3.1.6 The RIS&RMMS system shall be capable of handling the data and analysis requirements for a minimum of 35000 KM of road network with its connected infrastructures like bridges, culverts, etc. The system shall be capable of centralised storage and processing of digital data and streaming digital content such as photos, videos, drone data etc.

3.1.7 The RIS&RMMS system shall be such that the general administration and user access to the system can be controlled from a single point (Super admin).The system shall be capable of assigning, controlling and monitoring various user activities depending upon user roles, workflows and privileges which can be controlled from a single administration point. The system shall be flexible in all these

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aspect in a sense that department specific workflows, user privileges etc can be set and can be modified at any time. There shall be no limit on the number of users that can access the system for getting information or use the various functions of the system. The system shall also be capable to control the use and users of all types of filed inspection and data dissemination apps from the same administration point.

3.1.8 No encrypted data should be stored in the Database (except User ID/Password related to users).

3.1.9 The RIS&RMMS system shall be able to receive data in different standard formats, store, retrieve, analyse and modify the data and visualise the data and analyse results in an efficient manner. The system shall have built in modules for these with the capability of customisations as per the departmental needs. The system shall have built in standard analysis and MIS reporting formats and tools.

3.1.10 The RIS&RMMS system shall be capable of developing and optimising budget and work plans with ability to analyse work programmes and budget requirements at the State and District level. It shall facilitate central management and auditing of work plans. The system shall be capable of modelling and analysing existing asset and road network details using the condition data and project different optimisation scenarios. Model optimisation using latest HDM-4 models is a must and the system shall generate input data for HDM-4 analysis. The system shall be able to work with other modelling approaches and compare the outputs.Any non-HDM-4 model methodology should also be able to be incorporated into the system and model outputs from several models should be able to be compared and the decision on model selection to be taken accordingly.

3.1.11 The RIS&RMMS system shall have the ability to graphically represent asset condition data and its trends. It shall have the facility to project future trends and time series data representation in graphical form. The system shall have the ability to show all type of data, video or images geo-coded with GIS map representation from a single central database. It shall have the ability to interrogate the data in a drill down approach.

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3.1.12 Apart from the standard modules and functions, the RIS&RMMS system shall have the ability to receive, store, retrieve, visualise and analyse the different types of data regarding the environmental/climate/natural disaster in a time series manor. The system shall have the capability to generate input data to be used in the modelling engines like HDM-4 to generate climate and disaster resilient models for future projections. The system shall be capable of affecting any customisations regarding this at a later stage based on the input from the RMMS Consultants.

3.1.13 The RIS&RMMS system shall have the ability to receive geo-coded data through field inspection and data collection tools and apps using a web based architecture. The system shall have the ability to provide a centralised control of such apps and tools with necessary user administration modules. The system shall also provide facility to download the apks(installation files) for any registered user upon request.

3.1.14 The Supplier shall provide the entire software system security audited through certified CERT auditors acceptable to the SDC-Kerala authorities for hosting of the application in the State data centre. The entire cost towards this shall be borne by the Supplier.

3.2 Task-2 Supply, configure, host and maintain a Mobile application for both the android and i-os system which works on the above mentioned RIS & RMMS system framework and database for Kerala PWD(with all necessary supporting software installations), that would be used by the general public to get information on the PWD road assets and to submit feedbacks/grievances/complaints using web GIS facilities

3.2.1 This would be a public Smartphone app which is designed and developed to work on the main RIS & RMMS software framework and use its central database so that specific road asset information can be disseminated to the public in a controlled way using web GIS framework. Such app shall be lightweight, easily installable and configurable and easily downloadable through internet.

3.2.2 This app shall be capable of identifying the user using his mobile phone number /email id and for this an initial

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registration and user access control systems shall be incorporated with OTP based verification.

3.2.3 This app shall be capable of using mobile GIS system and location system so that if the user inputs any details the same shall be geo-tagged and saved to the central database.

3.2.4 This app shall have provisions for the user to submit his feedback or grievances or complaints on a particular road and related asset of Kerala PWD with photos. The system shall be capable of taking geo-tagged photos using the inbuilt camera of mobile phones and shall upload the whole data to the central server and after successful data submission give the user proper identification number or tracking id.

3.2.5 After receiving the input from a particular public user, the system shall show the details on appropriate visual reports on the RIS & RMMS system depending upon the departmental user authorisations and privileges. The system shall be capable of exchanging such data with the other software systems of PWD through web services API.

3.2.6 The app shall show the status of grievance to a particular public user after verifying the user and the tracking id number.

3.2.7 The app shall not allow the user to submit a complaint on a non PWD asset. This shall be done based on the available asset database in the RIS & RMMS system at the time of usage.

3.3 Task-3 Review the data collection procedures based on requirements of RMMS system, HDM-4 analysis and other MIS reporting and analysis requirements of the Department and to Supply, configure, host and maintain custom made web based Smartphone apps(both in android and i-OS) to collect field data together with its storage and integration with the central RMMS server

3.3.1 The envisaged data collection procedures for the proposed RIS & RMMS system is by the use of automated road survey vehicles, through various field tests, by visual inspection by field engineers etc. The Supplier is required to study the requirements of the Department in terms of the data collection, HDM-4 analysis and other reporting needs.

3.3.2 The Supplier shall supply, configure, host and maintain Smartphone/Tab based pavement field inspection and data

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collection apps both for an android operating system or i-phone OS. Such apps shall be lightweight, easily installable and configurable and easily downloadable through internet.

3.3.3 These apps shall be integrated with the RIS&RMMS system in the same hosting environment of the RIS&RMMS system. The apps shall be designed in such a way that it shall take data from the RIS&RMMS system and upload the collected field data to the same RIS&RMMS system.

3.3.4 There shall be user authorisations for all such apps and shall only be made available for an authorised registered user of the RIS&RMMS system. There shall be no limit on the number of users who can use such apps.

3.3.5 The field inspection and data collection apps shall be capable of taking each data geo-coded with seamless sync-to-server technology and shall be able to work both online and offline modes.

3.3.6 The Supplier shall demonstrate that he has already developed at least five such mobile apps for field data collection for RMMS system and the same is being used elsewhere in his technical proposal.

3.4 Task 4 Provide licenses and associated costs for AMC during the first 5-year period for all the proposed technologies and third party software used for application/database/GIS map/Web servers and all associated middleware together with all cost for the complete maintenance and upkeep of the whole system established under this contract

3.4.1 The Supplier shall clearly indicate the procurement/licensing cost of their RIS & RMMS software with that of field inspection apps in their bid. The Supplier shall carry-out all periodic updates and software upgrades during the AMC period/periods at no extra cost. The costing shall indicate split-up details as below

a. Initial set-up cost including cost for licensing, customisations and modifications as required in this ToR

b. Annual maintenance cost for the initial five year period which shall include cost for licensing, , updates, upgrades , customisations and modifications as required in this ToR

c. Annual maintenance cost for each successive years after the initial five year period (up to three year) which shall include

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cost for licensing, , updates, upgrades , customisations and modifications as required in this ToR

3.4.2 The Supplier shall clearly indicate the procurement/licensing cost of all other proprietary software/technologies, third party software used for application/database/GIS map/Web servers and all associated middleware including that if any required for field inspection apps in their technical and financial proposal. The Supplier shall carry-out all periodic updates and software upgrades for all these items during the AMC period/periods at no extra cost. The costing shall indicate split-up details as below

a. Initial set-up cost including cost for licensing as required in this ToR
b. Annual maintenance cost for the initial five year period which shall include cost for licensing. , updates and upgrades as required in this ToR
c. Annual maintenance cost for each successive years after the initial five year period (up to three year) which shall include cost for licensing. , updates and upgrades as required in this ToR

3.4.3 The initial set-up of software/technologies as per item 3.4.1(a) and 3.4.2(a) shall be of the latest versions at the time of installation and the Supplier shall ensure this condition at the time of installation.

3.4.4 The procurement of licences for the HDM-4 pavement management system shall be the responsibility of the Department/KSTP. The calibration of HDM-4 shall be done through the RMMS consultant as and when required number of time series data is available in the system based on pavement composition and environmental conditions. However, the Supplier is required to assist the Department and the RMMS Consultant in the integration of RIS&RMMS software system output generation and modelling tools with that of HDM-4 to ensure the successful usage of the whole system.

3.4.5 The Supplier shall handover the complete final source code with all intellectual property rights of the installed RIS & RMMS system to the e-Governance Cell of PWD after the completion of user acceptance testing and hosting at the designated location. In case, any later customisations

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updation were done, the updated source shall also be submitted after the updations were affected.

3.4.6 The Supplier shall provide all necessary user manuals, training manuals and software documentations of their RIS & RMMS system including that of third party software mentioned in item (2) and (3) above both in hard copy(minimum 50 copies each) and softcopy form at the time of finalisation of installation.

3.4.7 The Supplier shall provide detailed design of database and about its overall entity relationships and data management along with data extraction methods. Supplier shall need to provide detailed Configuration and Customization Manual (for each screen, function, report, etc. and process followed in configuration and customization of RIS&RMMS system) to enable PWD to make any changes in future.

3.4.8 The Supplier shall provide the complete source code of the installed RIS & RMMS system including the mobile apps to the Department/KSTP after the completion of installation or after any modification or customisations done at a later date.

3.5 Task-5 Provide all necessary technical support for the installation and hosting of the RIS & RMMS software system and mobile app support systems in the designated Data Centre installation (State owned having internal cloud infrastructure) or at a central facility as directed by the Department including installation of all necessary supporting software systems for cyber-security compliances and database management.

3.5.1 The Supplier shall specify optimal hardware, network, backup, DR and other security infrastructure requirement and their models/specifications etc for the hosting of the entire systems considering enterprise use of the software, robust performance, clustering, and back-up facility and specify indicative costs for the same in their bid. The Supplier shall review the existing (or proposed) IT infrastructure specifications as provided to them by the department (for details of State Data centre facilities please visit http://www.itmission.kerala.gov.in/projects/kerala-state-data-center&http://www.itmission.kerala.gov.in/sites/default/files/Circulars/Cloud%20Hosting%20FAQ_1.pdf), and advise on the suitability for this in hosting and accessing the RIS&RMMS. Where deficiencies are observed with existing IT

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infrastructure, the Supplier is to advise on minimum enhancements to provide an acceptable user experience. Any procurement and installation required in physically upgrading the IT infrastructure for hosting shall be borne by the Department.

3.5.2 The Supplier shall ensure that his RIS& RMMS system shall be capable of successful hosting on the existing cloud hosting infrastructure of the State data centre of Kerala. The State Data Centre may provide the infrastructure (if available) upon request by the Department. In case of non-availability of any or all of the proposed hardware in the SDC, the Supplier shall provide assistance to procure the same through departmental procedures and then shall provide all necessary technical assistance both in terms of personnel and technology to the department in installing and configuring the same in SDC in full compliance with the prevailing rules and regulations of the SDC. This shall be done at no extra cost. However, the Department/KSTP shall bear the cost for procurement of any new hardware which is to be installed at the SDC if needed.

3.6 Task-6 Provide all technical assistance for integrating and harmonising the RMMS system and HDM-4 software(Department shall procure the HDM-4 software separately) and render necessary help(RMMS software related) in determining the annual maintenance needs for road asset management and help to prepare annual work programs (AWP) and multiyear rolling work programs based on plan and non-plan budgets for network improvement and Annual Maintenance Plans (AMP) containing the identified needs based on the budget allocation

3.6.1 During the course of the project and extended support period if any, inventory and condition data for the State road network will be collected separately by the Department either through contract with a specialized data collection agency or through Departmental Officers.

3.6.2 The Supplier shall assist and train designated departmental officers in validating and uploading any such data that is collected during the project period (including extended maintenance period if any) into the database for efficient use of the RIS & RMMS system.

3.6.3 The Supplier shall also provide support for data analysis and for preparation of Annual Work Programs (AWP) and Annual

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Maintenance Plans (AMP) every year and provide support for the budget preparation, and impart training to departmental engineers in this regard as and when needed.

3.7 Task-7 Provide necessary training to the designated departmental staff in the software systems established both in terms of its functioning, usage and administration and to establish a sustainable arrangement for continuance of training for an agreed time as per an agreed schedule

3.7.1 The Supplier shall train a minimum of one hundred (100) designated engineers of PWD on system use, data input, analysis and interpretation. Supplier shall train fourteen (14) PWD engineers as trainers to continue training programmes and provide training material for all the engineers. Training shall be organized at circle office level and at PWD head Quarters. Trainers shall be trained to prepare training materials as well.

3.7.2 Supplier shall train about five more engineers in configuration and customization of the RIS & RMMS software including field data collections apps.

3.7.3 The Supplier shall suggest appropriate time requirement for the above training in their technical proposal and shall indicate the cost for such trainings and training materials in the financial proposal.

3.7.4 The trainings shall be through class room lectures and through hands-on experience. This shall be augmented with audio/video training materials so that users can refer these manuals at any time. As such, the Supplier shall develop audio/video training material on all aspects of the RIS&RMMS system and field inspection apps.

3.7.5 All such training materials shall be presented to the designated Chief Engineers (CEs) of the Department before starting actual training. Based on the recommendations / suggestions of CEs, if any, the Supplier shall revise the training material, and then integrate it with Department's e-learning program in the WINGS software systems, after due consultation with the Chief Engineers.

3.7.6 The training process shall be carried out throughout the support period as per the requirement of the department or when there is major change or upgrade of the system or

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change of departmental officers due to transfers or promotions.

3.8 Task-8 System maintenance and support

3.8.1 The Supplier, after successful installation and customization of the RIS & RMMS software, its User Acceptance Testing, Cyber Security Audit, and hosting, will start the maintenance support of the systems.In the financial proposal, the consultant shall mention the cost for the maintenance support for five years as detailed in Task-3. These costs will be used in financial evaluation. This support and maintenance will involve following tasks/activities;

3.8.2 User support / hot line: The user support includes resolution of technical issues, resolving any problems that may arise during the normal use of software by the officers. This includes provision of dedicated e-mail ID (response time not more than 24 hours) and voice-chat (express resolution) through a dedicated telephone number (during client's normal working hours).

3.8.3 Administrative and Technical Assistance: This involves tasks not only limited to troubleshooting, bug fixing, providing support for any technical issue, but also system and database administration, or issues arising from any integration/technology upgrade at the SDC etc. Further, software shall be upgraded to adapt to any change in version of database/middleware/internet technology/internet browser version during the five-year maintenance support period without any cost to Client. The technical support includes on-line chat (during client's normal working hours), dedicated e-mail ID (response time not more than 48 hours) and voice-chat (express resolution) through a dedicated telephone number (during client's normal working hours).

3.8.4 System Integration: The proposed RIS & RMMS system is envisaged to manage the whole road network referencing and road asset data of Roads and Bridges wing of Kerala PWD. The Supplier shall provide support to share the data as required by the Department with other applications like PRICE software, WINGS e-Governance system etc. Similarly, any GIS layers shared with other applications shall be interfaced with web-GIS application.

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3.8.5 Other Services: This will include services to provide and install periodic updates, patches, undertaking enhancements and refinements required in the interface, menu, additional attribute, reports to improve its effectiveness based on the feedback information collected from its use. A technical document mentioning the details of the requested enhancement of software updates/patches and the type and extent of changes conducted on the software must be clearly mentioned. The Supplier shall be responsible for testing the patches and upgrades, and successfully deploy the same on the servers.

D. FUNCTIONAL REQUIREMENTS

The following functional requirements are given only to guide the Supplier to understand the minimum requirements of client in terms of the functional aspects of the proposed RIS & RMMS system. This shall only be taken as a guideline and the COTS software which the Supplier is proposed to deliver shall at least cater for these minimum requirements. It is always advantageous to provide other additional features and enhancements in addition to these.

a) **Terminology:** All Screen Labels, Menu Items, and Reports should be configurable to the Client conventions in English.

b) **Network Referencing:** The RIS & RMMS should support different network referencing schemes. These should include the linear distance from the start of the road section, linear distance from the start of a road, as well as distance from known location reference points.

c) **Cross-Sectional Positioning:** The RIS & RMMS should support different cross-sectional positional models, to enable data to be referenced laterally to a location on a road section, in terms of lanes, shoulders, ditches, verges etc.

d) **Network Coding Rules:** The RAMS should enforce the Client's Network Numbering rules, by performing data validation on entry or through some other form of the internal validation procedure.

e) Network Editing: The RIS & RMMS should permit splitting and joining of road sections, and modification of road section lengths, while preserving the integrity of all current and historical data stored against the affected sections.

f) Network Auditing: The RIS & RMMS should audit all changes to the road network definition, and allow the review of those changes. The audit should record the date and time of network change, the nature of the change, and the user name of the person who made the change.

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g) User Defined **Data Items, Functionality and Processes**: The RIS & RMMS should be configurable to enable the user to define additional types of inventory and condition data to be stored, and to define what attributes are to be stored against each type of inventory. There should be no restriction on the number and type of items or their attributes, other than physical limitations of the database management system being used. The RIS & RMMS must have user-definable data entry forms, including labels in the local language so that the user does not need to use a table view for entering new types of data.

h) **Historical Data**: The RIS & RMMS should allow the storage of data over different periods, to enable comparison of data over time. There should be the functionality to view/select the most current data.

i) **Multi-Media Data:** The RIS & RMMS should enable management and display of multi-media objects (e.g. photographs, video etc.) as attributes of inventory items. For video, the RIS & RMMS should allow viewing of video data by chainage along the road section, based on frame/chainage lookup tables supplied. The GIS should display the multi-media objects in the correct spatial location, and the images should be accessible by selecting them in the GIS.

j) **Data Level Security:** The RIS & RMMS should permit security setup so that the user may have different security privileges for sub-networks in different geographical or administrative areas. It should also permit setup so that different users have different levels of access for different types of data.

k) **Function Level Security:** The RIS & RMMS should permit security setup so that different users may have access to different application modules and functions within these modules.

l) **Flexible Reporting:** The RIS & RMMS should provide flexible reporting to enable Department staff to devise their own reports and to make those reports available to other users. Reporting of all items in the RIS &RMMS database must be permitted, including reporting on user defined items and attributes, comparisons of current data with historical data, audit records etc. Export to a spreadsheet and/or comma-delimited text files should also be provided. The Supplier should also provide details of any interfaces to third-party reporting tools.

m) **Dynamic Sub-Sectioning:** The RIS & RMMS should provide a dynamic sectioning capability that allows sections of homogenous characteristics to be generated and reported upon. This should allow a combination of all types of data stored in the system. The RIS & RMMS should allow parameters to be specified for a minimum length of the section, and also threshold changes in value at which new sections should be created.

n) **Schematic Line Diagrams/Strip Maps:** The RAMS should enable the production of schematic line diagrams and/or strip-maps annotated with any data stored in the RIS & RMMS.

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o) **Integration with GIS or any other open freely available platform:** The RIS & RMMS should integrate with the Client's GIS, Google maps or any other open freely available platform. The following functions should be included:

(i) From the RIS & RMMS, while reviewing a particular road section, the user should be able to view and highlight that road section in the GIS. The interface should highlight if there is any missing GIS representation for a given road section.

(ii) Selected attributes of the road section, as stored in the RIS & RMMS, should be able to be viewed from the GIS, used as screen labels, and be available for thematic mapping. These attributes should include all section-wide attributes including section identifier, road identifier, the defined direction of the section, road classification, IRI, PCI etc.

(iii) The GIS interface should be able to display dynamically segmented data from the RIS & RMMS. This means that any data stored in the RIS & RMMS that varies by length along the road section can be correctly displayed in the GIS.

(iv) The GIS interface should be able to view all background GIS data held in the Client's GIS database.

p) **Climate and Disaster related data management**

Environmental/Climate related data:- The system shall take environmental factors such as humidity, temperature and rainfall into account while predicting the deterioration and future condition of the road. The model or modeling engine must accept the data and predicted values from the relevant authorities such as the Meteorological Department (IMD), Centre for Earth Sciences etc in any format.

i) Modeling engine for HDM4 or any advanced models should be configured to allow environmental factors in the modeling parameters set;

ii) The factors must include forecasted humidity, rainfall and temperature;

iii) Historical and projected data must be displayed on graphs and GIS maps.

Disaster related data & management:-

The roads are arterial to help people or transport to a safer location when the disaster is forecasted or happens. In these unfortunate events having the dataflow in place and sending information to the right authorities is the key. The system should provide the following features to help in taking the necessary steps by providing the right information:

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i) Show the historical and forecasted information on the GIS maps;
ii) show historical data on the disaster and the impact that caused;
iii) Send SMS/email alerts to Divisional Authorities when the forecasted information is available from the relevant departments
iv) Identify the worst affected areas/roads in case the disasterlike flood, landslides etc happens and suggest alternative routes using GIS maps;
v) Provide special inspection forms (in mobile application also) to inspect the roads after a disaster such as floods, earthquakes, under slips and over slips taken place;
vi) The data from the special inspection forms needs to be escalated to the right authorities immediately and show the information on the GIS map. This information could trigger alternative routes if the data indicates the road closures due to a disaster.

q) **HDM-4 Interface/Non-HDM4 models:** The RIS & RMMS should interface with **HDM-4** (the Highway Development and Management Tools), or any other Non-HDM4 models. The interface should include the following elements:

i. An automatic sectioning function to create 'homogeneous' sections for analysis based on inventory and condition data;
ii. A generic interface which allows the user to define the rules for the above- mentioned automatic sectioning. This can include specification of which data items to use, what transformations to apply to the individual data items (i.e. average, minimum, maximum, dominant, weighted average), minimum and maximum lengths of sections etc.;
iii. An interface to import the modeling segments if those were defined elsewhere;
iv. Fully configurable modeling parameters, treatment types, budgets and along with define rules of the treatment triggers;
v. Ability to configure advanced and modern modeling techniques by using Machine Learning (Artificial Intelligence) algorithms;
vi. Preparation of HDM-4 Input files for Work Standards, Traffic Classification and Growth Rates;
vii. Averaging and Preparation of data for Strategy Analysis as well as Program Analysis;
viii. Import of the results of the works program generated by HDM-4 (if the external HDM-4 Software does the modeling) so that they can be related to the real road network and displayed in tabular or map-based reports. Depending on how complex the system is and what it is intended for, this may also require the RAMS retaining a copy of the road network definition passed to HDM-4 , so that if any changes occur to that network between the time of passing the data and getting the results, then they do not prevent the results being imported.

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1) User Management and access control

Sl.No	Function	Sub-Function	Role
1	User Creation	Get list of Users from State Single Sign On (SSO) facility	Super Admin
		Alternatively Create users with password	
		Entry/Edit/Update user information Using Form	
		Assign/Remove Jurisdiction	
		Assign/Remove Roles	
		View/Print Users list	
		Reset password for all users	
2	Jurisdiction Creation and Management	Define Circles , Divisions, Sub-divisions and Section offices Define Employee cadre, post and designations	
		Define asset classifications based on the type of asset	
		Define other master data required for system running	
		Edit/Update data	
		View/Report data	
3	Role Creation and Management	Add/remove available functions to each role in each module	
		create new role(s) in each module	
4	Login to the RIS & RMMS system	Login screen using url or portal sub-domain	
		On-line Password retrieval /reset using mobile number and OTP	
	Login Homepage	Quick access to modules, dashboard, reporting, Web-GIS etc.	

2) Road Information system

Sl.No	Type	Function	Role
1	Asset info and general	Create Road or other asset by either copying from external vector/shape file or digitizing overlaid image	RIS/GIS Admin Super Admin
		Assign asset jurisdictions/Classification etc.	
		Rename Road	
		Split/Merge Road Segments	
		Recalibrate Road by chainage	
		Retire Road	
		Search/ View /download roads, geo-tagged video data	
		View data in Reports and in Web-GIS	
2	Road Inventory	Define road inventory list and data entry	RIS User

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		Using Form by road	
		Data entry Using CSV Loader by roads (option to download formats) Data entry using online forms for each stretch of road(all type of data) including uploading specific type of files containing specific data	
		Upload/View photographs/documents/video (geo-tagged) all type of data depending upon jurisdiction	
		Edit/Update	
		Search, view data and download	General User
		View data Reports and in Web-GIS	
		View in Strip-charts, graphical reports, GIS maps	
3	Pavement Composition , Pavement condition, Roughness, RoW, terrain features, environment and disaster related data etc	Define attribute list and data entry Using Form by road	RIS User
		Data entry Using CSV Loader by roads (option to download formats)	
		Edit/Update	
		Upload/View photographs/documents (geo-tagged) all type of data depending upon jurisdiction	
		Search, view specific data in reports and download	General User

3) Traffic Information system

Sl.No	Type	Function	Role
1	Traffic Survey Station	Define attribute list and data entry Using Form by road	TIS Admin/Super Admin
		Edit/Update data	
		Retire	
		Search/View/Download data	
		Upload/View Photographs/documents/video	
2	Traffic Volume Count Vehicle Type	Define attribute list and equivalency factors Using Form	
		Edit/Update data	
3	Axle Based Vehicle Type	Define attribute list and characteristics Using Form	
		Edit/Update data	
4	SCF (Seasonal Correction Factor)	Define attribute list/ Add new set and data entry Using Form	
		Edit/Update	
		Apply SCF to traffic volume counts to derive AADT	
5	Growth Factor	Define attribute list/ Add new set and data entry Using Form	
		Edit/Update	
		Estimate future traffic by growth factor and by trends	
6	Data Validation	Comparative charts to depict traffic by (direction) hour of the day for each day of volume count	
		Comparative charts to depict traffic by daily volume by each week day in	

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		previous years	
		Allow data validation by estimating traffic variation	
7	Traffic Assignment	Associate traffic station to road	TIS user
		Assign proportional traffic (by vehicle type) to road sections	
		Edit defined proportion of traffic	
		Delete/reassign traffic	
		View data in reports, Web-GIS	
8	Traffic Volume Count Data	Data entry Using CSV Loader (option to download formats)	TIS User/TIS Admin
		Edit/Update	
		Data View/download/Report	
		Delete/Retire	
		Validate, Commit or Reject data	
		Define traffic class	
		Assign traffic class to sections	
9	Axle Load Data	Data entry Using CSV Loader (option to download formats)	TIS User/TIS Admin
		Edit/Update Axle Load Data	
		View/Download/Report Axle-load	
		Delete Axle Load Data	
		Entry?Edit/Update/View/Delete Axle-load Volume Count	
		Validate Axle-load with Vol. Count	
		Commit/reject Axle-load Vol. Count	

4) Bridge and culverts Information System

Sl.No	Type	Function	Role
1	Bridge and culverts Inventory	Define attribute list	BIS Admin/BIS User
		Define bridge/culvert location by chainage in a road	
		data entry Using Form	
		Data entry Using CSV Loader by roads (option to download formats)	
		Edit/Update/Download data	
		Upload/View images and video for condition and inventory (geo-tagged)	
		View data in Report and Web-GIS	General User
2	Bridge/culverts Condition	Define defect list by bridge components	BIS Admin/BIS User
		Define defect severity and extents	
		Define defect priority and condition index parameters	
		Entry inspection data using Form	
		Entry inspection data by different time periods	
		Estimate bridge condition index for bridges	
		Upload/View images and video for condition and inventory (geo-tagged)	
		Edit/Update/Download data	
		View/Download/Report data in Web-GIS	General User

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5) Web-GIS Interface

Sl.No	Type	Function	Role
1	Selectable Layers (Roads, Bridges, Culverts, Traffic Stations, other assets to be finalized with PWD during design stage)	Click on respective layer to make visible on display panel	General User
		Click to select assets and display summarized information	
		Annotate layers with chainages, names etc.	
		Set colour, transparency of the layer	
		Select asset to view/download data report, documents, photographs etc.	
2	Search and view assets by road	Select jurisdiction and search road	
		Select assets and zoom to the location	
		Select asset to view/download data report, documents, photographs etc.	
3	Query on attributes of assets	Select Asset type	General User
		Select multiple attributes of the asset including jurisdiction	
		Specify values, conditions matching a criteria	
		Query to view the matching assets	
		View/download reports	
4	Additional layers	Integrate additional layers through GIS Server services	Super Admin
		List layers	General User
		Click on the layer to overlay	
		Select to view values/annotations	
		Select colour/ transparency etc.	
5	General Features and tools	Zoom and pan	General User
		Measuring length and area	
		Adding base layers Overlay like google maps and , other available online map services without any additional charges to PWD	
		Create points by specifying x and y coordinates	
		Click on road alignment to get x and y coordinates, chainage	

6) General Mobile application

Sl.No	Type	Function	Role
1	Login and Homepage	compact login/logout screen	General user/public
	Grievance Redressal	Login using mobile number and password and one time verification using OTP	
2	Grievance Redressal	Mark locations based on GPS based auto fly	
		Summarised information about assets such as road and bridge statistics	
		Search a road to obtain selected information (inventory, traffic, condition etc.)	
		User will have provision to raise Grievance request/ upload photograph / comment	

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		Functionality to track Grievances with its current status	
		Allot Grievance to division	Grievance admin

E. USER ACCEPTANCE TESTING AND COMPLIANCE TESTING

The Consultant shall prepare a user acceptance test plan and submit to PWD/KSTP before undertaking a User Acceptance Testing (UAT). The test plan will use data collected by CSIR-CRRI for 4000 km of selected PWD roads. The test plan will consist of but not limited to each functional aspect described above. The Consultant shall demonstrate each function using software tool in step by step procedure to the representatives of PWD who will evaluate and accept each tool and suggest refinement or modifications(if any) to be undertaken on it.

Following successful acceptance, the consultant shall migrate all the data and deploy the application in the staging arrangement of SDC. The RIS & RMMS system with mobile apps will undergo compliance testing before hosting the system (in the production environment at SDC) including functional as well as non-functional (security audits) as required by SDC at its own cost through certified CERT-In auditors. The security vulnerabilities identified by the auditor will be rectified by the Consultant within least possible time. Upon security clearance, Consultant shall host the RIS & RMMS system with mobile apps at the production environment.

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IMPLEMENTATION & PAYMENT SCHEDULE TABLE

During the course of the assignment, the Consultant needs to submit following deliverables at defined times. On successful acceptance, the Consultant shall be paid a percentage of fees designated for each deliverable as given below

Sl.No	Deliverable	Timeline(from commencement of service)	Payment (% of total accepted amount)
1	Submission and approval of Inception report with System Architecture/ Design Report (all the modules and components) and acceptance testing plan	Within 20 days	5 %
2	Modification of the software systems as per the approved acceptance testing report , delivery of the software systems complete with all third party software and licenses, installation and hosting in the staging arrangement of SDC or other approved locations	Within four months	18 %
3	Completion of compliance testing & approval of reports with production of security audit certificates & hosting in live or production environment so that entire system with mobile app for public & field data collection apps is ready for usage. Submission of final source codes of RIs & RMMS system and field apps	Within five months	35%
4	Submission of training and audio & video training materials, Programmers & User Manual (it should include details about Database, Programming File Details & Various Compiled component), Configuration & Customization User Manual, Configuration &Customization Administrator Manual , Procedure Manual to integrate external application etc with completion of 1st round of user trainings	Within six months	8%
5	Annual Maintenance plan and report and its approval during support period of 5 years	By end of every year of next five years	@ 5% for each year for five years
6	Successful delivery of services & supports in keeping the whole system workable during extended service period of 3 years.	By end of every year of the next three years	@ 3% for each year for three years

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The Supplier's bid and original Price Schedules

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1 Attachment 1 – Bidder's Eligibility to Bid

1.1 Introduction

- TRI has more than 40 years' experience and provide global thought leadership in road maintenance management solutions to public sector organisations across the globe
- TRL's asset management software *i*ROADS (proposed for Kerala PWD) is in use around the world. We constantly update and enhance its capabilities to meet the changing needs of our customers, and as a result of research using it, tens of millions of pounds have been saved in the UK and internationally through a reduction in maintenance activities
- TRL is not just a software development house. We maintain and manage road network for roads authorities across the world using our own solutions like iROADS. Hence we fully understand the practical on-ground challenges, risks and best practices in road maintenance management.
- TRL provides wider road maintenance management solutions including specification, data collection, implementation, maintenance strategy, quality assurance, audit and training to the road agencies across the globe
- TRL helped develop the World Bank HDM-4 model for highways. We are the only authorised provider of HDM-4 support across the world and have trained users in many countries to make best use of the analysis capabilities of the tool.
- TRL delivers its road transport solutions/ systems through its long term strategic partner Experion Technologies, based in Techno-Park [Trivandrum] and Info-Park [Kochi]. **TRL India and Experion Technologies are based in Trivandrum permanently.**
- For a project spanning 8 years, TRL (with its globally renowned road transport management capabilities) and Experion (large software technology team with local presence) brings immense value and sustainability to Kerala PWD

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TRL (the UK's Transport Research Laboratory) is one of the largest and most comprehensive independent centres working in transport in the world. We have over 400 technical staff, whose expertise covers a wide range of areas including road maintenance management systems, asset management, road safety, institutional strengthening, road research and development, highway and rural road design, construction and maintenance, transport planning, sustainable transport, socio-economic assessment, climate change mitigation and adaptation, and environmental assessment.

TRL was originally established in 1933 by the UK Government as the Road Research Laboratory (RRL), which was then privatised in 1996.

Since 1955, TRL has supported international aid programmes (including DFID, World Bank, ADB, IDB, European Union and UN Agencies), helping developing countries to establish and maintain their transport infrastructure and reduce death and serious injury on their roads. Our teams work closely with national ministries and roads agencies, providing extensive training and capacity building to ensure a lasting transfer of knowledge.

TRL is represented in India by TRL Professional & Software Services (India) LLP, a Limited Liability Partnership between TRL International Limited, a wholly owned subsidiary of TRL Limited, and Lex Favios Private Limited, registered in India. The partnership receives a 99% capital contribution from TRL International Limited.

Established in 2016, TRL Professional & Software Services (India) LLP is wholly controlled and backed by TRL Limited. Through TRL Professional & Software Services (India) LLP, TRL therefore offers the benefits of having a contracting and delivery entity based in India, which provides its Indian clients with unfettered access to the entire breadth and depth of TRL's global expertise and experience.

The LLP has, to date, successfully delivered two World Bank funded projects to the Ministry of Road Transport and Highways in India: Value Engineering Project and Institutional Framework for Research & Standardisation in the Road Sector and also another World Bank funded project 'Traffic Management and Road Safety Enforcement Programme in SCDP' for KSTP.

For this assignment, **TRL Professional & Software Services (India) LLP will work in JV with Experion Technologies (India) Private Limited**, who has been working with TRL since 2008 delivering information system projects across the globe. In this bid, TRL will be the lead partner (or partner in charge) in the JV and Experion will be secondary partner

TRL will provide the license of its Road Maintenance Management System (RMMS) known as iRoads, and the multidisciplinary team of TRL and Experion will provide the necessary skills and expertise to configure, customize, host and maintain the Road Maintenance Management System (RMMS) for Kerala Public Works Department (PWD), in accordance with the Terms of Reference to execute the project "SUPPLY, INSTALLATION, TESTING AND

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Key Project Risk -

Long term sustainability

Globally, it has been seen that long-term sustainability is the key risk factor in RMMS projects. Including Kerala. Consultant's come and go. TRL & Experion (with its 500+ staff) is locally based in Trivandrum Technopark which reduces this risk significantly. This team already delivers large transport related projects globally based out of Trivandrum.



TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
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1.2 General Information Form [Lead Member or Partner in Charge]

1.	Name of firm: TRL Professional & Software Services (India) LLP	
2.	Head office address: E-277, Greater Kailash – 1, New Delhi – 110 048	
3.	Telephone:	Contact: Tony Mathew (tmathew@trl.co.uk)
4.	Fax:	Telex:
5.	Place of Incorporation/ Registration: New Delhi	Year of Incorporation/ Registration: 2016

Nationality of Owners[1]

TRL Professional & Software Services (India) LLP is a Limited Liability Partnership between TRL International Limited, which is a fully owned (100%) subsidiary of TRL Limited, and Lex Favios Private Limited, registered in India. The partnership receives a 99% capital contribution from TRL International Limited.

TRL International Limited is represented by Peter Van Campen, S/o Arnold Van Campen, R/o: 36 Goldcrest Road, Bracknell, RG12 8DZ, UK. Peter Van Campen is also the Finance Director and board member of TRL Limited.

Certificate of Incorporation

TRL Professional & Software Services (India) LLP is a Limited Liability Partnership between TRL International Limited, which is a fully owned (100%) subsidiary of TRL Limited, and Lex Favios Private Limited, registered in India. The partnership receives a 99% capital contribution from TRL International Limited.

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1.3 General Information Form [JV Partner]

1.	Name of firm: **Experion Technologies (India) Private Limited**	
2.	Registered Office: 407, 4th Floor, Thejaswini, Technopark Campus, Kariavattom P.O, Thiruvananthapuram - 695581, India. Branch Office : 802, 8th Floor, Lulu Cyber Tower I, Infopark SEZ, Kakkanad, Kochi, India.	
3.	Telephone: 0471-3072121	Contact:0471-3047319
4.	Fax:	Telex:
5.	Place of Incorporation/ Registration: Thiruvananthapuram, Kerala	Year of Incorporation/ Registration: 2006

Nationality of Owners[1]		
Name:		Nationality:
1	Binu Jacob	Indian
2	Sreekumar A Pillai	Indian
3	Suresh V P	Indian
4	Brajesh C Kaimal	Indian
5	Vinod Kumar Balakrishna Pillai	German (Overseas Citizen of India)

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
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1.4 General Information Form [Parent Company of TRL India]

1.	Name of firm: TRL Limited	
2.	Head office address: Crowthorne House, Nine Mile Road, Wokingham, RG40 3GA, UK	
3.	Telephone: +44 1344379743	Contact: Subu Kamal (skamal@trl.co.uk)
4.	Fax:	Telex:
5.	Place of Incorporation/ Registration: UK	Year of Incorporation/ Registration: 1995

Nationality of Owners[1]

TRL Limited is owned by the Transport Research Foundation (TRF), a non-profit distributing foundation, overseen by 80 sector members from the Transport Industry. The TRF is classified as a non-profit distributing organisation (NPDO), a form of business structure where all profits are redistributed to services or business growth, rather than being distributed to shareholders. TRL's profits are invested in its own research programmes, selected by the TRF to enhance knowledge in critical areas such as safety, environmental impact and sustainable development.

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1.5 Certificates of Incorporation

– TRL Professional & Software Services (India) LLP

GOVERNMENT OF INDIA

MINISTRY OF CORPORATE AFFAIRS

Registrar, Delhi

4th Floor, IFCI Tower 61, Nehru Place, Delhi, 110019, India

FORM 17

[Refer Section 12(3)(b) of the LLP Act, 2008]

CERTIFICATE OF INCORPORATION

LLP Identification Number: AAH-9257

It is hereby certified that TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP is incorporated pursuant to section 12(3) of the Limited Liability Partnership Act, 2008

Given at Delhi this Ninth day of December Two thousand sixteen.

Registrar, Delhi

Note: The corresponding form has been approved by Tharia , and this certificate has been digitally signed by the Registrar through a system generated digital signature under rule 30(3)(d) of the Limited Liability Partnership Rules, 2009

The digitally signed certificate can be verified at the Ministry website (www.mca.gov.in).

Mailing Address as per record available in Registrar office:
TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP
E - 277, Greater Kailash - I,
Delhi, South Delhi,
Delhi, 110048, India

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Project Director
K.S.T.P., PWD
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Certificate of Incorporation – Experion Technologies (India) Private Limited

भारत सरकार-कॉर्पोरेट कार्य मंत्रालय
कम्पनी रजिस्ट्रार कार्यालय, केरल एवं लक्षद्वीप

नाम परिवर्तित की पश्चात नया निगमन प्रमाण-पत्र

[redacted]

मैसर्स INFOCEAN TECHNOLOGIES PRIVATE LIMITED

को सूचना दी, कि एतद्द्वारा सत्यापित करता हूँ कि मैसर्स
INFOCEAN TECHNOLOGIES PRIVATE LIMITED

जो मूल रूप से दिनांक तीस मार्च दो हजार छह को कम्पनी अधिनियम, 1956 (1956 का 1) के अधीन मैसर्स
INFOCEAN TECHNOLOGIES PRIVATE LIMITED

के रूप में निगमित की गई थी, ने कम्पनी अधिनियम, 1956 की धारा 21 की शर्तों के अनुसार विधिवत आवश्यक विशेषप्रस्ताव पारित करके तथा लिखित रूप में यह सूचित करके की उसे भारत का अनुमोदन, कम्पनी अधिनियम, 1956 की धारा 21 के साथ पठित, भारत सरकार, कम्पनी कार्य विभाग, नई दिल्ली की अधिसूचना सं. सा.का.नि. 507 (अ) दिनांक: 24 जून 1965 एस आर एन A83256127 दिनांक 16/06/2008 के द्वारा प्राप्त हो गया है, उक्त कम्पनी का नाम अब परिवर्तित रूप में मैसर्स
Experion Technologies (India) Private Limited

हो गया है और यह प्रमाण-पत्र, कंपनि अधिनियम की धारा 23(1) के अनुसरण में जारी किया जाता है।

इस प्रमाण-पत्र, मेरे [redacted] द्वारा हस्ताक्षरित मे अठत दिनांक सोलह जून दो हजार नौ को जारी किया जाता है।

GOVERNMENT OF INDIA - MINISTRY OF CORPORATE AFFAIRS
Registrar of Companies, Kerala and Lakshadweep

Fresh Certificate of Incorporation Consequent upon Change of Name

Corporate Identity Number: U72200KL2006PTC019336

In the matter of M/s INFOCEAN TECHNOLOGIES PRIVATE LIMITED

I hereby certify that INFOCEAN TECHNOLOGIES PRIVATE LIMITED which was originally incorporated on Thirtieth day of March Two Thousand Six under the Companies Act 1956 (No 1 of 1956) as INFOCEAN TECHNOLOGIES PRIVATE LIMITED having duly passed the necessary resolution in terms of Section 21 of the Companies Act, 1956 and the approval of the Central Government signified in writing having been accorded thereto under Section 21 of the Companies Act, 1956, read with Government of India, Department of Company Affairs, New Delhi Notification No G S R 507 (E) dated 24/06/1965 vide SRN A83256127 dated 16/06/2008 the name of the said company is this day changed to Experion Technologies (India) Private Limited and this Certificate is issued pursuant to Section 23(1) of the said Act.

Given under my hand at Ernakulam this [redacted] day of June Two Thousand Nine

REGISTRAR OF COMPANIES KERALA

(JOSEKUTTY V E)
कम्पनी रजिस्ट्रार / Assistant Registrar of Companies
केरल एवं लक्षद्वीप
Kerala and Lakshadweep

Mailing Address as per record available in Registrar of Companies office

Experion Technologies (India) Private Limited
C - 17, THEJASWINI BUILDING, TECHNOPARK CAMPUS KAZHAKUTTOM,
THIRUVANANTHAPURAM - 695581,
Kerala, INDIA

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum



CERTIFICATE OF INCORPORATION
OF A PRIVATE LIMITED COMPANY

Company No. 3142272

The Registrar of Companies for England and Wales hereby certifies that INTERCEDE 1165 LIMITED

is this day incorporated under the Companies Act 1985 as a private company and that the company is limited

Given at Companies House, Cardiff, the 29th December 1995

MRS. E. P. OWEN

For the Registrar of Companies

6th October 2005.

COMPANIES HOUSE

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum



CERTIFICATE OF INCORPORATION

ON CHANGE OF NAME

Company No. 3142272

The Registrar of Companies for England and Wales hereby certifies that

INTERCEDE 1165 LIMITED

having by special resolution changed its name, is now incorporated under the name of

TRL LIMITED

Given at Companies House, London, the 1st April 1996

For The Registrar Of Companies



COMPANIES HOUSE

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

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Project Director
K.S.T.P., PWD
Trivandrum

THE COMPANIES ACT 2006

Company No. 3142272

The Registrar of Companies for England and Wales hereby certifies that TRL LIMITED (originally called INTERCEDE 1165 LIMITED which name was changed by resolution on 1st April 1996 to TRL LIMITED) was incorporated under the Companies Act 1985 as a limited company on 29th December 1995.

The Registrar further certifies that according to the documents on the file of the company:-
a) PETER VAN CAMPEN and ROBERT WALLIS are the directors of the company,
b) the situation of the registered office is CROWTHORNE HOUSE, NINE MILE RIDE, WOKINGHAM, BERKSHIRE RG40 3GA.

According to the documents on file and in the custody of the Registrar, the company is up to date with its filing requirements and has at least 1 director, who is a natural person over the age of 16.

The company has been in continuous unbroken existence since its incorporation and no action is currently being taken by the Registrar of Companies to strike the company off the register or to dissolve it as defunct. As far as the Registrar is aware, the company is not in liquidation or subject to an administration order, and no receiver or manager of the company's property has been appointed.**********

Given at Companies House, the **2nd February 2017**

G THOMPSON
for the Registrar of Companies

This certificate records the result of a search of the information registered by the Registrar. This information derives from filings accepted in good faith without verification. For this reason the Registrar cannot guarantee that the information on the register is accurate or complete.

Companies House

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

experion technologies

TRL THE FUTURE OF TRANSPORT

PROPOSAL

SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF A WEB BASED SOFTWARE SYSTEM FOR ROAD MAINTENANCE MANAGEMENT FOR THE KERALA PUBLIC WORKS DEPARTMENT

ATTACHMENT 2 – BIDDER'S QUALIFICATIONS

CLIENT:

KERALA STATE TRANSPORT PROJECT
PUBLIC WORKS DEPARTMENT
GOVERNMENT OF KERALA

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

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Trivandrum

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2 Bidder's Qualifications

2.1 Financial Information

Table 2-1 Turnover Information – TRL Limited[1]

Annual turnover data (applicable activities only)		
Year[1]	Turnover [GBP £Million]	US$ Million Equivalent
2018-19	30.93	39.28
2017-18	32.60	43.05
2016-17	31.16	40.59
2015-16	33.59	44.72

Table 2-2 Turnover Information – Experion Technologies

Annual turnover data (applicable activities only)		
Year[1]	Turnover [INR]	US$ Equivalent
Apr 2019 – Nov 2019	INR 39,05,23,759	$ 54,41,323
2018-19	INR 45,54,08,672	$ 65,73,451
2017-18	INR 31,80,80,342	$ 48,83,776
2016-17	INR 28,23,43,743	$ 43,53,797
2015-16	25,18,77,545	36,75,649

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[1] The UK Financial Year is from July to June. The auditor signed off financial statements of the previous years (which shows the turnover data from 2015 until 2018) are included as supporting document; The financial statement for FY 2018-19 has not been signed off yet, hence not included.

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The evidence documents to support the turnover information mentioned in the above tables are included as Annexure A and B in this attachment.

- Annexure A – TRL Limited's supporting information
- Annexure B – Experion Technologies (India) Private Limited's supporting information



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2.2 Proof of Access to Line of Credit – TRL

[Please see next page]

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ICICI Bank

RENEWAL CREDIT ARRANGMENT LETTER

May 10, 2019
Ref. No. CAL212098191892

TRL Professional & Software Services (India) Limited
E-277, Greater Kailash I,
New Delhi, 1100048, India

Attention: Mr. Colin Grant

Dear Sir/s:

Sub: Renewal of Working Capital Facilities

We refer to the credit facility/ies in the form of working capital facility (**"Facility/ies"**, details whereof are mentioned in the Annexure hereto) granted to you by ICICI Bank Limited (**"ICICI Bank"**), pursuant to a credit arrangement letter including any amendments thereof (**"CAL"**, details whereof are mentioned in the Annexure) and other facility documents, executed in connection therewith (**"Transaction Document"**).

We are pleased to inform that the ICICI Bank, at your request, has renewed the Facility/ies on the same terms and conditions as applicable to the Facility/ies (as per Annexure), for a further period up to the date mentioned in the Annexure hereto. A processing fee as mentioned in the Annexure shall be charged and debited from your account towards renewal of the Facility/ies.

All the existing security and/or contractual comfort, if any, in respect of the Facility/ies, shall remain in full force and effect and continue to secure the Facility/ies, notwithstanding revision/s, if any.

In case of any change in the directors, Memorandum of Association, Articles of Association or other constitutional documents, post the information/documents last shared by you with ICICI Bank, you are requested to furnish updated records of the same to ICICI Bank. Kindly also ensure that your total working capital bank finance, including the renewed facility, does not and shall not during the subsistence of the Facility/ies, exceed the maximum permissible bank finance limits.

This Renewal Credit Arrangement letter (**"Renewal CAL"**) shall be read in conjunction with the Transaction Documents. All the existing security and/or contractual comfort, if any, in respect of the Facility/ies, shall remain in full force and effect and continue to secure the Facility/ies.

Yours faithfully,

(Authorised signatory)

PARTH SHUKLA

ICICI BANK LTD.

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TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

ICICI Bank Limited
ICICI Bank Towers
Bandra-Kurla Complex
Mumbai 400 051, India.

Tel.: (91-22) 2653 1414
Fax: (91-22) 2653 1122
Website www.icicibank.com
CIN.: L65190GJ1994PLC021012

Regd. Office : ICICI Bank Tower,
Near Chakli Circle,
Old Padra Road,
Vadodara 390 007, India.

ICICI Bank

Annexure
Details of the Facility/ies and CAL

Sr. No.	CAL No / Description	Date
1	CAL591362912266	May 14, 2018

Facility/ies	Overall Limits (₹ in million)	Outstanding amount as on May 09, 2019 (₹ in million)
Fund Based		
Overdraft	40.72	--
Overall Limit (total):	**40.72**	--

Facility valid up to	12 months from the date of sanction i.e. May 05, 2020 or 45 days prior to the SBLC expiry date whichever is earlier

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TERMS AND CONDITIONS

Facility: 1	Overdraft (OD)
Limit	₹ 40.72 million (restricted to £ 450,000)
Peak Limit	Uniform limit of ₹ 40.72 million throughout the validity of the Overdraft Facility.
Purpose	The Overdraft Facility shall be utilized by the Borrower for meeting its working capital requirements.
Sub-limit(s)	Nil
Interchangeability	Nil
Margins	
Inventory	Not applicable
Book debts	Not applicable
Validity of Facility	12 months from the date of sanction i.e. May 05, 2020 or 45 days prior to the SBLC expiry date whichever is earlier
Processing Fees	0.50% payable before limit set-up
Interest	The rate of interest stipulated by ICICI Bank shall be sum of I-MCLR-6M and "spread" per annum, subject to minimum of I-MCLR-6M, plus applicable interest tax or other statutory levy, if any, on the principal amount of the loan remains outstanding each day. As on date the I-MCLR-6M is 8.70% and spread is 2.25%. Above interest rate shall be reset at the end of every 6 months from the limit set-up date as a sum of I-MCLR-6M + "spread", prevailing on the reset date plus applicable interest tax or other statutory levy, if any. In case there is any change in the regulatory requirements by the regulator applicable to the facility pertaining to provisioning norms and/or risk weightage, then the Bank may revise the spread to reflect the regulatory change, subject to extant RBI guidelines.
Security	Unconditional and irrevocable Stand By Letter of Credit (SBLC), from Lloyds Bank PLC with internal rating of AA+ for an amount not less than GBP 500,000.0 in the form and manner acceptable to ICICI Bank Limited and with the validity of 45 days more than entire period of sanction of the facility

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Repayment	The Borrower shall, unless otherwise agreed to by the Bank, repay to the Bank forthwith on demand such of the amount as may be outstanding at the foot of the relevant Account in respect of the Overdraft Facility, together with all interest, costs, charges, expenses and monies whatsoever stipulated in, or payable under, the Facility Agreement and/or the other Transaction Documents.
Interest Frequency Payment	Interest will be served on monthly basis.

OPERATIONAL TERMS AND CONDITIONS

Review	Lender reserves the right to review the Facility at periodical intervals; consequent to such review, the Facilities may be continued / cancelled / reduced depending upon the conduct and utilization of the Facilities.	
Period of sanction	The working capital facilities are payable on demand. However the facilities are available for a period of 12 months subject to review at periodical intervals wherein the facilities may be continued / cancelled / reduced depending upon the conduct and utilization of the facilities.	
Insurance	Waived	
Unit Visit	Waived	
Stock Audit	Waived	
Valuation		
Inventory	Raw materials, stores, Consumable stores, spare.	At cost, current market rates, Govt. controlled rates or invoice rates, whichever is the lowest.
	Work in Process	Raw materials at cost plus factory overheads.
	Finished Goods	At cost, current market rates, Govt. controlled rates, Borrower's selling price, and whichever is the lowest.
Periodicity of submission of	Stock Statement	Waived
	Other financial	Waived

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information to the bank.	Information (OFI)	
	Data required for renewal of credit limits	On or before the expiry of the credit limits
	Audited / unaudited financial statements	Waived
Creation of charges	New Sanction	NA
	Renewal cum enhancement	NA
Other condition	The Borrower shall furnish the following within sixty days from the due date: • Declaration to be submitted by the Borrower regarding information with regard to credit facilities availed from other bankers is obtained as per Annexure I of the RBI Circular 'Lending under consortium arrangement / Multiple Banking arrangements' before limit set-up • Copy of Half-yearly certification by professional with regard to compliance of various statutory prescriptions is obtained as per Annexure III of the RBI Circular to be submitted by the borrower.	
Multiple Banking Arrangement	A declaration containing details of the existing credit facilities being enjoyed would be furnished by the borrower as per RBI under multiple banking arrangement	
Special Conditions	• Maximum amount of funding would be restricted to 90% of amount of SBLC in favour of ICICI Bank. • The SBLC shall be renewed prior to the expiry date of the SBLC • The continuation of facility will be at the sole discretion of ICICI Bank Limited irrespective of renewal of the SBLC • The facility would be subject to availability of limits with Lloyds Bank PLC • The outstanding amount in respect of credit facilities being allowed, and outstanding interest, commission and other dues, including applicable statutory levies, should not be greater than the SBLC amount at any point of time. • In the event of non-fulfillment of the aforesaid clause, all amounts outstanding shall become payable immediately and the said SBLC shall be invoked forthwith.	
Repayment by Issuer	In case of repayment, the liability shall be repaid by	

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	i) payment out of rupee balances held in India or ii) by remitting the funds to India or ii) by debit to FCNR/NRE account maintained with any authorized dealer bank in India
Treatment of Invoked Funds	In case of event of default & invocation under the SBLC if the funds needs to be repaid/returned by the resident borrower in due course, such repayment transaction by the borrower/ debtor should be in compliance with one of the following conditions: If transaction is treated as equity investment from overseas guarantor into Indian borrower/debtor, it should be in compliance with extant FDI regulations and subject to RBI approval OR If repayment transaction is treated as loan from overseas guarantor to Indian borrower/debtor, RBI (ECB Division) approval should be obtained. This novated loan should be compliant with the following: The all-in-cost ceilings as applicable to the relevant maturity period of the Trade Credit/ECBs shall be applicable to the novated loan. If the loan is serviced in Indian Rupees, the applicable rate of interest would be the coupon of the bonds or 250 bps over the prevailing secondary market yield of 5 years Government of India Security, as on the date of novation, whichever is higher; The reporting arrangements as applicable to the ECBs would be applicable to the novated loan OR If the repayment transaction is treated as current account payment/remittance (and not a capital account transaction such as loan or equity investment as mentioned herein above), the overseas guarantor should be paid-off by Indian borrower immediately but not later than 3 months (so that it is not treated as loan). No interest payment from India should be permitted in such cases. If after 3 months period, Indian borrower is not able to pay-off the overseas guarantor, Indian borrower through AD bank should obtain RBI (ECB Division) approval for treating the liability as ECB/trade credit/loan.

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Unhedged Foreign Currency Exposure	a) Under Representations: (i) The Borrower represent that it has adopted a suitable hedging policy, approved by its board of directors, which includes mechanisms to reduce its currency mismatches. b) Under Undertakings/ Covenants: (i) The Borrower's hedging policy shall remain in full force and effect and updated from time to time, till all the monies due and payable under the Facility Agreement/ Transaction Documents are fully paid to the satisfaction of the Bank/ Lender. (ii) The Borrower shall provide all information as may be required by the Bank/ Lender from time to time in relation to its foreign currency exposures and hedging details in relation thereto. c) Under Other Covenants/ Pricing/ Interest: In the event of any change in applicable laws/ regulations (including regulatory/statutory requirements pertaining to provisioning norms and/or risk weightage), the Bank/ Lender shall have the right to recover the cost, in any manner that it deems fit, including by way of revision in spread/applicable rate.
Unconditional Right of Cancellation	The Bank reserves the unconditional right to cancel the outstanding un-drawn commitments to be advanced under the CAL and/ or Transaction Documents (either fully or partially) without giving any prior notice to the Borrower, on the occurrence of any one or more of the following: i. in case the Overall Limits/part of the Overall Limits are not utilized by the Borrower; or ii. in case of Deterioration in the Creditworthiness of the Borrower in any manner whatsoever; or iii. in case of non-compliance of the terms and conditions of the Transaction Documents and/or CAL. For the purpose of this clause, Deterioration in the Creditworthiness shall mean and include without limitation, the following events: a) downgrade of the rating of the Borrower by a Credit Rating Agency; b) inclusion of the Borrower and/or any of its

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	Directors in the Reserve Bank of India's willful defaulters list; c) closure of a significant portion of the Borrower's operating capacity; d) decline in the profit after tax of the Borrower by more than fifteen percent; e) any adverse comment from the Auditor; and f) any other reason/ event in the opinion of the Bank constituting or which may constitute Deterioration in the Creditworthiness; The Borrower unconditionally agrees, undertakes to get itself rated by Credit Rating Agency/ies (if required by the Lenders) within a period of six months of such request by Lenders and/or at such intervals as may be decided by the Bank, failing which the Bank shall have the right to review the applicable interest rate and/or costs, charges and expenses, which shall be payable by the Borrower and on such date/s or within such period as may be specified by the Bank." "Credit Rating Agency" shall mean and refer to the domestic credit rating agencies such as Credit Analysis and Research Limited, CRISIL Limited, FITCH India and ICRA Limited and international credit rating agencies such as Fitch, Moody's and Standard & Poor's and such other credit rating agencies identified and/or recognized by the Reserve Bank of India from time to time.

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OFAC Clause	1. The Borrower hereby, in addition to the representations, declarations and warranties contained in the General Conditions, makes the representations, warranties and agreements as given below and confirms that the same will continue to remain, true, correct, valid and subsisting in every respect till the money remains remain to ICICI Bank under the Facility: Neither the Borrower nor any other person benefiting in any capacity in connection with or from the Facility Agreement and/or any instruments and/or payments thereunder is a Specially Designated National (SDN) and/or otherwise sanctioned, under the sanctions promulgated by the United States (including its Office of Foreign Assets Control's (OFAC)), India, United States, United Nations, European Union, the jurisdiction of the Facility Office and/or any other country (collectively, the "Sanctions"). 2.The Borrower hereby acknowledges, covenants and agrees that: a) the Sanctions may become applicable with respect to the Facility and/or transactions thereunder, including to any documentary credits and/or guarantees issued and/or disbursements and/or payments made by the Bank pursuant to the Facility Agreement. Sanctions may pertain inter alia, to the purpose and/or end use of the Facility, goods manufactured in or originated from/through certain countries, shipment from/to/using certain countries, ports, vessels, liners and/or due to involvement of certain persons and entities (including correspondent banks and the Facility Office). Consequently, disbursement, issuance, payment and/or processing under the Facility by the Bank may become subjected to the Sanctions and the Bank shall have the unconditional right to refuse to process any transactions that violate/may violate any Sanctions. b) it shall ensure that the transactions entered into pursuant to the Transaction Documents do not violate any Sanctions and that no persons, entities or otherwise, currently subject to any Sanctions are involved in any transactions hereunder. The Borrower agrees that it shall not avail of the Facility or use the proceeds of the Facility in any transaction with, or for the purpose of financing the activities of, any person currently subject to any Sanctions as aforesaid.

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	c) it shall indemnify and hold harmless the Bank, to the fullest extent permitted by applicable law, for all losses and liabilities (including due to claims by a third party), incurred by the Bank as a result of any breach by it of its representations and undertakings contained herein pertaining to the Sanctions and/or due to any action taken by the Bank pursuant to the Sanctions. No action taken by the Bank pursuant to the Facility Agreement, including grant of the Facility, issuance of any financial instruments thereunder or processing of any payments or transactions, nor any action taken by the Borrower in relation thereto, shall be deemed to be a waiver of any of the Bank's rights under any provisions of the Transaction Documents related to the Sanctions nor shall they act to relieve the Borrower of its obligations or liabilities in relation thereto. The Borrower hereby agrees and confirms that any breach of the terms and conditions stipulated hereinabove, shall constitute an Event of Default under the Facility Agreement.

DEFAULT INTEREST RATES

Sl	Nature of default	Reckoning of default interest	Default interest rate (p.a.) payable monthly
1	Non-submission or delayed submission of financial statements	Default interest charged from the submission till the date of actual submission Due date of sub follows:	Nil
	1. Provisional	3 months from accounting year	
	2. Audited	6 months from accounting	
	3. Renewal data	On expiry of credit limits	

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2	Payment default (in case of foreign currency loans, the foreign currency amount will be converted into equivalent rupee and default interest as mentioned herein will be charged	Default interest would be charged from the day after of the due date till such time as the default amount is paid	6% over the Documented Rate
3	Non-compliance of sanction terms	Any stipulated security not created, perfection requirements and other formalities not completed and/or sanction terms not complied with	For the first 15 days of noncompliance : Nil Breach continuing beyond 15 days: 1%*

* The rate shall be over and above the interest rate on the facility

For ICICI Bank Limited

(Authorized signatory)

PARTH SHUKLA

ICICI BANK LTD.

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Project Director
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2.3 Proof of Access to Line of Credit – Experion Technologies (India) Private Limited

[Please see next page]

TRL PROPRIETARY & CONFIDENTIAL

Project Director
K.S.T.P., PWD
Trivandrum

RANJIT KARTHIKEYAN ASSOCIATES
CHARTERED ACCOUNTANTS
Reg No: 006705 S | Thiruvananthapuram | Cochin | Kozhikode

SOLVENCY CERTIFICATE

We the **Ranjit Karthikeyan Associates**, Chartered Accountants. Thiruvananthapuram-695 035 do hereby certify that **Experion Technologies (India) Private Limited (CIN: U72200KL2006PTC019336)** having their Registered office at 407,4th Floor, Thejaswini Building ,Techno park Campus, Kazhakuttom ,Trivandrum -695 581,is solvent to the extent of Rs. 1,50,00,000 (Rs One Crore Fifty Lakhs Only) or more as disclosed by the information and records which are available with the aforesaid bank.

It is further notified that this certificate is being issued at the request of **Experion Technologies (India) Private Limited.**

CA. Jayaprakash D, B.com. FCA
Partner (Membership No. 533736)
UDIN: 19533736AAAAFC1573

Trivandrum
12/12/2019

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Project Director
K.S.T.P., PWD
Trivandrum

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12/654, Pranam, Thampuran Mukku, Vanchiyoor PO, Thiruvananthapuram, Kerala - 695 035, India.
+91 471 2308020 / 2308030 | rkaclients@gmail.com, tvm@rkaglobal.com | www.rkaglobal.com

2.4 Technical Information – Standard Forms [TRL]

1.	Number of contract: 1
	Name of Contract: ***Nigeria Infrastructure Advisory Facility (NIAF) Phase 2***
	Country: ***Nigeria***
2.	Name of Purchaser: ***Adam Smith International***
3.	Purchaser Address: ***240 Blackfriars Rd, London, SE1 8NW, UK***
4.	Nature of Information Systems and special features relevant to the contract for which the bidding documents are issued: *TRL were responsible for delivering the roads sector component of NIAF2. The aim of this work was to instil and support a maintenance culture in the road sector such that maintenance and renewal investments were based on rational engineering assessments and prioritised so that the cost of recovering the network condition is minimised. The cornerstone of this approach was the development a Road Asset Management System (RAMS), supported by a robust data gathering regime.* *TRL developed, implemented and integrated a RAMS, and designed, developed and deployed bespoke road network survey equipment to enable collection and storage of road asset information, that can be then used to derive best value for the Nigerian Federal road network, using whole life cost analysis and Nigeria specific decision support tools. The RAMS is TRL's iROADS system for storing, processing, displaying, monitoring and reporting road asset information, and is linked to HDM-4 for detailed economic evaluation of road works alternatives.* *TRL were responsible for Capacity building of Ministry of Works and Federal Roads staff with the development of processes and on the ground training of undertaking road network surveys, the use of iROADS and HDM-4 at both operator and management levels.* *Trained Ministry of Works and Federal Roads staff in using iROADS and HDM-4 in processing road network information and developing maintenance programmes based on sound economic principles.* Road length 35,000 km.
5.	Contract Role (check one) - ***Subcontractor***
6.	Amount of the total contract/ subcontract/ partner share (in specified currencies at completion or at date of award for current contracts) Currency ***GBP £5.8m*** Currency ***GBP £900K*** Currency
7.	Equivalent amount US$ Total Contract: ***$7.50m*** Subcontract: ***$1.2m*** Partner Share: $
8.	Date of award/ completion: ***Apr 2016 – Dec 2016***
9.	Contract was completed 0 months ahead/ behind original schedule (if behind,

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Project Director
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Trivandrum

1.	Number of contract: 2
	Name of Contract: ***iRoads SAAS PFi Module for Amey-Sheffield***
	Country: ***UK***
2.	Name of Purchaser: ***Amey LG Limited***
3.	Purchaser Address: ***Olive Grove Road, Sheffield, S2 3GE, UK***
4.	Nature of Information Systems and special features relevant to the contract for which the bidding documents are issued: *Development of iRoads PFI (Private Finance Initiative) module for Amey-Sheffield to help them manage Streets Ahead Highways Maintenance and Management service across Sheffield.* *The contract involves the improvement and maintaining of 1,947 kilometres of road, 3,380 kilometres of pavement, 68,000 street lights, 36,000 highway trees, 28,000 street signs, 72,000 drainage gullies, 480 traffic signals, 18,000 items of street furniture, 2.9 million sqm of grass verges and over 600 bridges and highway structures.* *The following feature list was developed:* • *Data Importing: Network Data Definition, Carriageway SSCI Data, Footway SSCI Data Wheel track Rutting Data, Skid Data, Skid Threshold Data, Deflection SSCI Data* • *Performance Index Calculations; Deflection SSCI Data, Deflection SSCI Data, Carriageway Skid Calculations, Carriageway Skid Calculations, Footway Condition Index Calculation, Footway Condition Index Calculation.* • *Report Outputs; Community Assembly Area Carriageway Condition Index Reports, Community Assembly Area Footway Condition Index Reports, Carriageway Section Condition Index Reports, Carriageway Average Sub-Section Condition Index Reports, Carriageway Wheel Path Rutting Report, Carriageway Skid Risk Score Reports, Carriageway Deflection Condition Index Report, Carriageway Deflection Average Sub-Section Condition Index Report, Footway 10m Structural Sub-Section Condition Index Report, Footway 50m Overall Sub-Section Condition Index Report.*
5.	Contract Role – ***Prime Supplier***
6.	Amount of the total contract/ subcontract/ partner share (In specified currencies at completion or at date of award for current contracts) Currency ***GBP £1.013 Million***
7.	Equivalent amount US$ Total Contract: ***$1.33 Million***
8.	Date of award/ completion: ***Aug 2019 – Jul 2038***
9.	Contract was completed__0__ months ahead/ behind original schedule (if behind, provide explanation)

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Trivandrum

	provide explanation)
10.	Contract was completed US$_0_ equivalent under/over original contract amount (if over, provide explanation)
11.	Special contractual/ technical requirements: None
12.	Indicate the approximate percent of total contract value (and US$ amount) of Information System undertaken by subcontract, if any, and the nature of such information system:

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Project Director
K.S.T.P., PWD
Trivandrum

10.	Contract was completed US$_0_ equivalent under/over original contract amount (if over, provide explanation)
11.	Special contractual/ technical requirements: None
12.	Indicate the approximate percent of total contract value (and US$ amount) of Information System undertaken by subcontract, if any, and the nature of such information system: N/A

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Project Director
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000203

1.	Number of contract: 3
	Name of Contract: ***KCCA Roads Infrastructure Inventory and Conditions Assessment***
	Country: ***Uganda***
2.	Name of Purchaser: ***Fugro Aperio Limited***
3.	Purchaser Address: ***Focal Point, Newmarket Road, Cambridge, CB25 9BD, United Kingdom***
4.	Nature of Information Systems and special features relevant to the contract for which the bidding documents are issued: *TRL optimised the iROADS system for use in Kampala, then installed and populated iROADS as the Road Asset Management System for Kampala. The project also included the development of the network definition, configuring the system for maintenance treatments, the development of maintenance rules, guidance documents and training, and the collection of road surface condition data in Kampala.* *Road Length – 183 Km*
5.	Contract Role (check one) – ***Prime Supplier***
6.	Amount of the total contract/ subcontract/ partner share (in specified currencies at completion or at date of award for current contracts) Currency ***USD $2.3M*** Currency ***GBP £500K*** Currency
7.	Equivalent amount US$ Total Contract: ***$2.3M*** Subcontract: ***$650K*** Partner Share: $
8.	Date of award/ completion: ***June 2014 – June 2015***
9.	Contract was completed__0__ months ahead/ behind original schedule (if behind, provide explanation)
10.	Contract was completed US$_0_ equivalent under/over original contract amount (if over, provide explanation)
11.	Special contractual/ technical requirements: None
12.	Indicate the approximate percent of total contract value (and US$ amount) of Information System undertaken by subcontract, if any, and the nature of such information system: GBP500K

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

000204

1.	Number of contract: 4
	Name of Contract: ***Mauritius - Implementation of a Road Management System***
	Country: ***Mauritius***
2.	Name of Purchaser: ***Road Development Authority, IBRD***
3.	Purchaser Address: ***Jhugroo Building, St Paul Road, Vacoas, Mauritius***
4.	Nature of Information Systems and special features relevant to the contract for which the bidding documents are issued: *TRL developed and implemented a road and bridge management system for Mauritius.* *TRL established a computer-based road information system and developed the road monitoring procedures. A model for the central preparation of annual programs and budgets for road maintenance was established, drawing on existing approached. The work included knowledge transfer/training.* *TRL also developed a Bridge Management module appropriate for the bridge types and environments found in Malawi and Mauritius. The systems had to be such that they would remain sustainable in the longer term based on the available staff and equipment. The work included consultation with the Roads Authority to determine the requirements of the system.* *Road Length – 2,066 Km*
5.	Contract Role - ***Prime Supplier***
6.	Amount of the total contract/ subcontract/ partner share (in specified currencies at completion or at date of award for current contracts) Currency ***GBP £331K*** Currency Currency
7.	Equivalent amount US$ Total Contract: ***US $430K*** Subcontract: $ Partner Share: $
8.	Date of award/ completion: ***Jan 2009 – Dec 2014***
9	Contract was completed__0__ months ahead/ behind original schedule (if behind, provide explanation)
10.	Contract was completed US$_0_ equivalent under/over original contract amount (if over, provide explanation)
11.	Special contractual/ technical requirements: None
12.	Indicate the approximate percent of total contract value (and US$ amount) of Information System undertaken by subcontract, if any, and the nature of such information system: N/A

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000205

Project Director
K.S.T.P., PWD
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1.	Number of contract: 5
	Name of Contract: *Gambia: Supply, Installation, Training of HDM-4*
	Country: *Gambia*
2.	Name of Purchaser: ***Dept of State for Works Construction & Infrastructure, Gambia***
3.	Purchaser Address: ***MDI Road, Kanifing, Gambia***
4.	Nature of Information Systems and special features relevant to the contract for which the bidding documents are issued: *A contract was awarded to TRL by the EU to develop a Pavement Management System (PMS) for the National Roads Authority (NRA) in The Gambia under the guidance of the TA provided by WSP. The PMS comprises two components; a centralised road database entitled Road Data Manager (RDM) which is linked to the economic road investment software, the Highway Development and Management tool (HDM-4).* *The main activities of the contract were:* • *Design field survey forms* • *Development/setup of RDM Gambia* • *Setup and calibration of HDM-4* • *Training NRA staff in the use of RDM and HDM-4* • *Digitising maps of The Gambia* *Road Length – 3,800 Km*
5.	Contract Role – ***Prime Supplier***
6.	Amount of the total contract/ subcontract/ partner share (in specified currencies at completion or at date of award for current contracts) Currency ***Euro 135K*** Currency Currency
7.	Equivalent amount US$ Total Contract: ***$170K*** Subcontract: $ Partner Share: $
8.	Date of award/ completion: ***Jan 2012 – Dec 2016***
9.	Contract was completed__0__ months ahead/ behind original schedule (if behind, provide explanation)
10.	Contract was completed US$_0_ equivalent under/over original contract amount (if over, provide explanation)
11.	Special contractual/ technical requirements: None
12.	Indicate the approximate percent of total contract value (and US$ amount) of Information System undertaken by subcontract, if any, and the nature of such information system: N/A

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000206

Project Director
K.S.T.P., PWD
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1.	Number of contract: 7
	Name of Contract: ***Software Services for development of reports for HDM-4***
	Country: ***UK***
2.	Name of Purchaser: ***HDMGlobal, University of Birmingham Enterprise Ltd***
3.	Purchaser Address: ***Birmingham Research Park, Vincent Drive, B15 2SQ, Birmingham, UK***
4.	Nature of Information Systems and special features relevant to the contract for which the bidding documents are issued: *HDMGlobal had several issues in their existing reporting which they have used for creating reports in their HDM-4 product. Also they planned to adopt a much better reporting platform to meet the emerging reporting requirements. So, they approached TRL to migrate the existing reports to ActiveReports platform which can solve various issues they faced with the existing reporting mechanism.* *The objective of this project was to develop standard reports using ActiveReports tool by referring to the exisiting Report templates and deliver these via ActiveReports templates with HDMGlobal for integrating within the HDM-4 software.* *Some of the report developed include:* • *AADT for section alternatives, AADT for project alternatives* • *Average Roughness by Project (Graph), Average Roughness by Section (Graph)* • *Pavement Condition (Bituminous Pavements), Pavement Condition (Concrete Pavements)* • *Pavement Condition (Unsealed Pavements), Pavement Condition Summary* • *Road Works Summary (by Section), Road Works Summary (by Year)* • *MT RUC Summary per veh-km by Vehicle (Graph), MT Vehicle Operating Speed Averages (Graph)* • *Economic Indicators Summary* • *Road Agency and User Cost Streams (Discounted), Road Agency and User Cost Streams (Undiscounted)* • *Optimum Section Alternatives (Constrained Budget), Optimum Section Alternatives (Unconstrained Budget)* • *Pavement Surface Condition Summary by Budget Scenario, Roughness: Average for Road Network by Budget Scenario* • *Work Programme Optimised by Section, Work Programme Optimised by Year* • *Work Programme Unconstrained by Section, Work Programme Unconstrained by Year*
5.	Contract Role – ***Prime Supplier***
6.	Amount of the total contract/ subcontract/ partner share (in specified currencies at completion or at date of award for current contracts) Currency ***GBP £18.5K*** Currency Currency

808000

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7.	Equivalent amount US$ Total Contract: ***$24K*** Subcontract: $ Partner Share: $
8.	Date of award/ completion: ***Sep 2019 – Dec 2019***
9.	Contract was completed__0__ months ahead/ behind original schedule (if behind, provide explanation)
10.	Contract was completed US$_0_ equivalent under/over original contract amount (if over, provide explanation)
11.	Special contractual/ technical requirements: ***None***
12.	Indicate the approximate percent of total contract value (and US$ amount) of Information System undertaken by subcontract, if any, and the nature of such information system: N/A

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000208

1.	Number of contract: 8
	Name of Contract: **Consultancy Services to provide customise and implement a Road Accident data Management System (RADMS) for HPSRP**
	Country: **India**
2.	Name of Purchaser: **HRSRP, Himachal Pradesh Road 7 Other Infrastructure Development Corporation Ltd (HPRIDC), State of Himachal Pradesh, India**
3.	Purchaser Address: **Nirman Bhawan, Nigam Vihar, Shimla 171002**
4.	Nature of Information Systems and special features relevant to the contract for which the bidding documents are issued:

Development and implementation of a Web based Road Crash Analysis Solution.

This was the first full implementation of the iMAAP Crash database system for a State in India. The project provided a complete Crash and Road Safety Management system for Himachal Pradesh (locally known as the "Road Accident Data Management System" - RADMS).



The project included a major configuration of the iMAAP system for local crash reporting forms and for other local requirements which was identified following an in-depth review of current systems and capacity. iMAAP RADMS application also was integrated with VAHAN and SARATHI systems, to collect vehicle registration and driver license data with ease.

The Consultant also worked closely with the Police to set up an Accident Data Management Cell (ADMC) where the iMAAP support team and dedicated police team monitors the accident data coming into the RADMS system on a daily basis.

There was also training developed for stakeholder personnel in data collection and also analyses methods. Notably the project developed and implemented mobile capability for the police to collect crash details using android mobile devices from crash scenes. This has the aim of improving data collection efficiency, quality and also timeliness significantly.

Project Highlights:

The project was initiated in 2014 and rollout to the entire state completed on 2016. During the course of the project implementation,

- *150+ meetings during the project execution with various stakeholders*
- *13 deliverable reports prepared and submitted during the implementation period*
- *59-man months spent on ground during the implementation period*

Training Summary:

The project team had delivered 60+ training programs on crash data collection, analysis and road safety trainings to various stakeholders. There are approximately around 1500+ people were trained. This includes class room trainings, on-the-job trainings and site visit trainings.

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	• *70+ man days of dedicated training delivered to various stakeholders* • *20 crash data collection trainings at 14 different districts to around 650 participants involving police, highway engineers and PWD staff.* • *32 refresher trainings on iMAAP web and mobile application to approximately 350 participants during the support and maintenance period.* • *10 road safety trainings to 400 participants at various districts by TRL Experts during the support and maintenance period.*
5.	Contract Role - **Lead Member in JV**
6.	Amount of the total contract/ subcontract/ partner share (in specified currencies at completion or at date of award for current contracts) Currency **$496k** Currency Currency **INR 15.9M**
7.	Equivalent amount US$ Total Contract: **$496K** Subcontract: $ Partner Share: **$187K**
8.	Date of award/ completion: **Feb 2014 – Feb 2016**
9.	Contract was completed__0__ months ahead/ behind original schedule (if behind, provide explanation)
10.	Contract was completed US$_0_ equivalent under/over original contract amount (if over, provide explanation)
11.	Special contractual/ technical requirements: None
12.	Indicate the approximate percent of total contract value (and US$ amount) of Information System undertaken by subcontract, if any, and the nature of such information system: N/A

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2.5 TRL's Recent Innovations of Road Asset Maintenance Management

2.5.1 Road Condition Monitoring Mobile App for Highways England [2019



Highways England currently measures ride quality on the strategic network by recording the shape of the road using laser surveys. The shape data is converted into a parameter that quantifies the ride quality. Transport Focus (TF) and the Office of Rail and Road (ORR) have undertaken studies that suggest that the reported ride quality does not reflect the quality of the surface that road users expect. Therefore Highways England have asked TRL to investigate how they could improve the ability to understand the ride quality experienced by road users

TRL has developed an App running on a tablet computer that passengers can use to record their experience of ride quality, and have undertaken a pilot trial to investigate how this can be used to obtain objective data. Users regularly record their experience of the ride and bumpiness, and the App records this data in relation to geographical position. This quantitative data can be directly compared with measurements of road shape collected using 3D laser measurement systems such as HARRIS3. The pilot trial was successful. We have refined the App based on the findings of the pilot, and are now undertaking a larger trial with members of the public. We will be processing the results in the autumn, comparing them to HARRIS3 data, and hence providing advice to Highways England on how to improve the assessment of ride quality on the network.

2.5.2 Traffic Speed Structural Survey QA & Accreditation [2019]

TRL have just been commissioned by Highways England to undertake the fourth instalment of the TRASS (**TRA**ffic speed Structural Survey) Quality Assurance & Accreditation task. The project has a 16 month timeframe with a value in the region of £250k. For this project TRL provides both Technical Advisor and Auditing functions. The Technical Advisors are responsible for ensuring the Highways England's Traffic Speed Deflectograph (TSD) vehicle and measurement equipment are correctly maintained and operating effectively. The Auditors undertake a monthly accreditation of the TSD measurement equipment along with providing on-going Quality Assurance (QA) services to ensure that the collected data is of the highest quality.

What is TRASS?

An essential element in the successful maintenance of the road network is the accurate, reliable and consistent assessment of the structural condition of the pavement. To help achieve this, Highways

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England and TRL have been working together since 2005 to develop and run the TRASS survey. The surveys are conducted at traffic speed and use an accredited vehicle fitted with multiple measurement devices (e.g. lasers, sensors, GPR) to provide carriageway structural condition data. The surveys are controlled by a detailed specification that defines the set of data that should be collected by the survey vehicle and how this should be processed and delivered. The specification also defines the required level of accuracy for the data and how the survey vehicle will be tested to ensure that they are compliant with the specification.



The resulting TRASS data is delivered to Highways England through the loading of the data onto Highways England Pavement Management System (HAPMS). The outputs from this process are then used for a network level assessment of the structural condition of the pavements. There is currently just one accredited TRASS survey contractor using Highways England's TSD and they aim to collect in excess of 14,000km of carriageway survey each year.

TRL have extensive experience in this area of vehicle validation, providing Accreditation and Quality Assurance services to the highways industry for over 20 years. Further work in this field includes:

- Highways England PAAQA (Pavement Assessment Accreditation and QA) project – this delivers accreditation and QA services for the Deflectograph, Sideways force Routine Investigation Machines and the Dynamic Plate Testing devices.
- Highways England TRACS (TRAffic speed Condition Survey) - Accreditation, QA and advice for the TRACS survey

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- SCANNER Accreditation - Annual accreditation of 12 SCANNER survey vehicles (from two different survey contractors) working on Local Authority networks.
- SCANNER Quality Assurance - Annual Quality assessment of the entire SCANNER data set delivered by the SCANNER survey, which results in the delivery of ~200 local authority assessments in the UK.

2.6 Project Experience Certificates

Usually, the consultants do not seek nor client issue experience certificates for the projects in Europe and Africa. Hence, we don't have a practice of getting experience certificates from our clients. We have requested all our clients to issue am experience certificate for the projects shown in the proposal. However, in the limited time available to prepare the Kerala RMMS proposal, we could not gather certificates from these clients.

Since this is a practice in India, we have managed to get an experience certificate from our client in Himachal Pradesh. For most of the other projects, we have included invoices, emails or work orders to evidence our involvement in these projects Please refer to the subsequent pages.

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Project Director
K.S.T.P., PWD
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TRL THE FUTURE OF TRANSPORT

INVOICE

Adam Smith International
240 Blackfriars Road

London

SE1 8NW
United Kingdom
Attn. Matt Uzzell

Customer Number	TL007126
Invoice Number	**88499157**
Invoice Date	06/12/2016
Job Number	11224196
VAT Registration No.	**GB 664 6253 21**
Customer Tax No	

REFERENCE

Cust. Ref.

Our Ref. NIAF iROADS Implementation

Invoice in respect of	Qty	Price per Unit	Price
November 2016 Invoice			104,714.47
TOTAL		GBP	104,714.47
VAT @ 20%		GBP	20,942.89
		GBP	125,657.36

BALANCE DUE BY 06/01/2017

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
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Please email any Invoicing queries to: Creditcontrol2@trl.co.uk

TRL Payment Terms:
Payment due within **30 days of Invoice date**, unless otherwise expressly agreed in writing
TRL reserve the right to charge the Customer interest, in accordance with the Late Payment of Commercial Debts (Interest) Act 1998, on all payments not received within the agreed payment terms

Account Name: 'TRL Limited'

BACS Payments: Lloyds bank, 10 High Street, Bracknell, RG12 1BT

GBP A/C: Sort Code: 30 63 54, A/C No 45613368
Swift Code: LOYDGB21653, IBAN No: GB56 LOYD 3063 5445 6133 68

Euro A/C: Swift Code: LOYDGB21653, IBAN No: GB79 LOYD 3063 5486 5278 45

US Dollar A/C: Swift Code: LOYDGB21653, IBAN No: GB73 LOYD 3063 5411 8191 35

AED A/C: Abu Dhabi Commercial Bank (ADCB), Abu Dhabi
Swift Code: ADCBAEAA, IBAN No: AE63 0030 0010 0596 9229 3001

QAR A/C: Qatar National Bank, Doha
Swift Code: QNBAQAQAXXX, IBAN: QA22 QNBA 0000 0000 0226 0297 0900 1

000214

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e enquiries@trl.co.uk
w www.trl.co.uk
dx 322501 Crowthorne 2

Registered in England No. 3142272

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USER ACCEPTANCE CERTIFICATE

Project Name: - iROADS PFI Development

Date of Delivery: - 07-Nov-2018

Deliverable: - iROADS PFI Application v 6.1.0.0

Details of Deliverable:

Deliverable Name	Version Number	Remarks
iROADS PFI Application	6.1.0.0	The application is hosted in TRL's AWS Infrastruture in the EU region. The application can be accesed using the URL - http://iroadsstaging.imaap.io/

List of Features Tested:

Feature Name	Status
Import Data and Import History	ACCEPTED
Calculate Indices	ACCEPTED
View/Download milestone reports	ACCEPTED

The Customer certifies to the Supplier that the Deliverable(s)/Features listed above have been reviewed and accordingly are approved by the Customer as at the approval signature date.

Comments:

Approval Details

Approved by :		Approved by :
S. WIBBERLEY	(Name)	M. THOMAS
ASSET MANAGER	(Designation)	PAVEMENT ENGINEER
	(Signature)	
29/01/19	(Date)	29/01/19

TRL Representatives:

SUBU KAMAL	(Name)
HEAD - Prod Mgmt + Pro Servs	(Designation)
	(Signature)
29.01.19	(Date)

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

000215

Project Director
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Registered in England No. 3142272.

TRL THE FUTURE OF TRANSPORT

INVOICE

Fugro Seacore Ltd (t/a Fugro Aperio)
Focal Point
Newmarket Road
Bottisham
Cambridge

CB25 9BD
United Kingdom

Customer Number	TL006524
Invoice Number	**88497566**
Invoice Date	29/06/2016
Job Number	11112904
VAT Registration No	**GB 664 6253 21**
Customer Tax No	

REFERENCE

Cust. Ref. **KCCA/SRVCS/13-14/00199**
Our Ref. Uganda KCCA Roads Infrastructure Inventory and Conditions Assessment

Invoice in respect of	Qty	Price per Unit	Price
KCCA Roads Infrastructure project Payment Milestone 4 and 5 Agreement no: J4104 TRANS-03			103,847 38
TOTAL		GBP	103,847 38
VAT @ 20%		GBP	20,769.48
		GBP	124,616 86

BALANCE DUE BY 29/07/2016

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

Please email any Invoicing queries to: Creditcontrol2@trl.co.uk

TRL Payment Terms:
Payment due within **30 days of Invoice date**, unless otherwise expressly agreed in writing
TRL reserve the right to charge the Customer interest, in accordance with the Late Payment of Commercial Debts (Interest) Act 1998, on all payments not received within the agreed payment terms

Account Name: 'TRL Limited'

BACS Payments: Lloyds bank, 10 High Street, Bracknell, RG12 1BT

GBP A/C: Sort Code: 30 63 54, A/C No. 45613368
Swift Code: LOYDGB21653, IBAN No: GB56 LOYD 3063 5445 6133 68

Euro A/C: Swift Code: LOYDGB21653, IBAN No: GB79 LOYD 3063 5486 5278 45

US Dollar A/C: Swift Code: LOYDGB21653, IBAN: GB73 LOYD 3063 5411 8191 35

AED A/C: Abu Dhabi Commercial Bank (ADCB), Abu Dhabi
Swift Code: ADCBAEAA, IBAN No: AE63 0030 0010 0596 9223 001

QAR A/C: Qatar National Bank, Doha
Swift Code: QNBAQAQAXXX, IBAN: QA22 QNBA 0000 0000 0226 0297 09004

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TRL THE FUTURE OF TRANSPORT

INVOICE

Dept of State for Works Construction & Infrastructure
MDI Road

Kanifing

Gambia
Attn. Mr Bakary Malick Houma

Customer Number	TL005677
Invoice Number	**88464732**
Invoice Date	09/10/2009
Job Number	11109846
VAT Registration No	**GB 664 6253 21**
Customer Tax No	

REFERENCE

Cust. Ref.	**EuropeAid/127367/M/SUP/GM**
Our Ref.	Gambia:Supply, Installation,Training of HDM-4

Invoice in respect of	Qty	Price per Unit	Price
90% of the contract price as per the letter from NRA dated 1 October 2009, payable in accordance with NRA Terms and Conditions In accordance with Article 40.2 of the contract, a remaining invoice of 10% of the contract value (Euros 13,500) will be raised one year from the date of provisional acceptance (1 October 2009), which shall be 30 September 2010.			101,845.80
		GBP	101,845.80
AMOUNT DUE		EUR	**121,500.00**
BALANCE DUE BY	09/11/2009		

Project Director
K.S.T.P., PWD
Trivandrum

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

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Account Name: 'TRL Limited'

BACS Payments: Lloyds bank, 10 High Street, Bracknell, RG12 1BT

GBP A/C: Sort Code: 30 63 54, A/C No 45613368
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Euro A/C: Swift Code: LOYDGB21653, IBAN No: GB79 LOYD 3063 5486 5278 45

US Dollar A/C: Swift Code: LOYDGB21653, IBAN: GB73 LOYD 3063 5411 8191 35

AED A/C: Abu Dhabi Commercial Bank (ADCB), Abu Dhabi
Swift Code: ADCBAEAA, IBAN No: AE63 0030 0010 0596 [illegible]

QAR A/C: Qatar National Bank, Doha
Swift Code: QNBAQAQAXXX, IBAN: QA22 QNBA 0000 0000 0226 0297 0900 1

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TRL THE FUTURE OF TRANSPORT

INVOICE

Road Development Authority
2nd Floor, Jhugroo Building
St Paul Road

Vacoas

Mauritius

Customer Number	TF000711
Invoice Number	**88468066**
Invoice Date	16/04/2010
Job Number	11110232
VAT Registration No	**GB 664 6253 21**
Customer Tax No	

REFERENCE

Cust. Ref. **RFP/RDA/30/08-09**

Our Ref Mauritius - Implemnentation of a Road Management System

Invoice in respect of	Qty	Price per Unit	Price
4th payment - 25% of foreign currency Completion of the development / adaptation phase			51,650.00
		GBP	51,650.00

BALANCE DUE BY 16/05/2010

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

Please email any invoicing queries to: Creditcontrol2@trl.co.uk

TRL Payment Terms:
Payment due within **30 days of invoice date**, unless otherwise expressly agreed in writing.
TRL reserve the right to charge the Customer interest, in accordance with the Late Payment of Commercial Debts (Interest) Act 1998, on all payments not received within the agreed payment terms

Account Name: 'TRL Limited'

BACS Payments: Lloyds bank, 10 High Street, Bracknell, RG12 1BT

GBP A/C: Sort Code: 30 63 54, A/C No 45613368
Swift Code: LOYDGB21653, IBAN No: GB56 LOYD 3063 5445 6133 68

Euro A/C: Swift Code: LOYDGB21653, IBAN No: GB79 LOYD 3063 5486 5278 45

US Dollar A/C: Swift Code: LOYDGB21653, IBAN: GB73 LOYD 3063 5411 6181 35

AED A/C: Abu Dhabi Commercial Bank (ADCB), Abu Dhabi
Swift Code: ADCBAEAA, IBAN No: AE63 0030 0010 0596 9229 3001

QAR A/C: Qatar National Bank, Doha
Swift Code: QNBAQAQAXXX, IBAN: QA22 QNBA 0000 0000 0226 0297 0900 1

000218

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Registered in England No 3142272

Approval Email for "Software Services for development of reports for HDM-4" project



This message originated outside your organisation

Dear Pradeep,

Thank you for delivering the report templates as highlighted in the original requirements document.

These have been tested both within the Active Reports development environment and within a custom application developed to test the reports with multiple data sets produced by HDM-4

I would like to thank you and your team for the work that you have performed on this task.

Kind regards

Dr Eric Stannard
HDMG local

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

053000

000219

Himachal Pradesh Road and Other Infrastructure Development Corporation Limited
State Roads Project, Nirman Bhawan, Nigam Vihar, Shimla-171002
FAX: 0177-2620663: Tel: 0177-2620663 / 2627602
Email ID: pdsrp-hp@nic.in

No.PW-SRP/RIDC/ Procurement-RADMS/2016- 1165 Dated:- 8-05-17

To

M/s TRL Ltd.(U.K) in Association with Subconsultant
M/s Experion Technologies (India) Pvt. Ltd., Trivandrum(Kerala-India), Address: Crowthorne House, Nine Mile Ride, Wokingham, Berkshire, RG40 3GA, UK, Tel: +44(0) 1344770753; FAX: +44(0) 1344770356; Email: skamal@trl.co.uk.
India Address (Experion) : 407, 4th Floor, Thejaswini, Technopark Campus, Thiruvananthapuram, Kerala, India-695581. Tel: +91-471-3047310;
FAX: +91-471-3047314; Email: binu.jacob@experionglobal.com.

Subject: - Consultancy Services to provide customize and implement a Road Accident Data Management System (RADMS) in the State of Himachal Pradesh- -**"iMAAP Installation Completion Certificate".**

Sir,

With reference to your office e-mail dated May 07, 2017, please find attached herewith the duly signed installation completion certificate in respect of the Consultancy Services to provide customize and implement a Road Accident Data Management System (RADMS) in the State of Himachal Pradesh

Yours Faithfully,

Encls :- As above.

Chief Engineer-cum-Project Director,
State Roads Project, Nirman Bhawan,
Nigam Vihar, Shimla-171002.

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

000220

TO WHOMSOEVER IT MAY CONCERN

No.PW-SRP/RIDC/ Procurement-RADMS/2016- 406 Dated:- 8-5-17

Project Name:	Consultancy Services to provide customize and implement a Road Accident Data Management System (RADMS) in the State of Himachal Pradesh
Client:	Himachal Pradesh Road and Other Infrastructure Development Corporation Limited (HPRIDC), State of Himachal Pradesh, India
Client contact:	Chief Engineer –cum- Project Director, HPRIDC, Nirman Bhawan, Nigam Vihar, Shimla -171002. Phone:- 0177-2627602, Email: pdsrp-hp@nic.in
Project Period:	From 6-Mar-2014 to 30-June-2016
Current Status:	Implementation over, maintenance and support on going through variation orders (from Jul 2016 to Jun 2017)
Project Value:	US$ 496,005 (foreign currency) + INR 15,965,503 (local currency)
Procurement mode:	International Competitive Bidding (ICB) as per World Bank Procurement Guidelines and Standards.
Key Stakeholders:	H.P. Police Deptt., HP Public Works Department (Roads Authority), HPRIDC World Bank Project, Transport Department of HP, Health Deptt. of HP (Health Authority), Himachal Pradesh Road Transport Corporation (HRTC).
Consultant Selected:	M/s TRL Ltd.(U.K) in Association with Sub consultant M/s Experian Technologies (India) Pvt. Ltd., Trivandrum (Kerala-India)
Software selected:	iMAAP Web and iMAAP Mobile from M/S TRL Ltd, UK

This is to certify that M/s TRL Ltd.(U.K) in Association with Sub consultant M/s Experian Technologies (India) Pvt. Ltd., Trivandrum (Kerala-India) has completed the above project and the system is being used successfully by all stakeholders in the State. The solution has helped all stakeholders take data-led countermeasures in the state and will be the key tool in helping to reduce the road crash rates in the State of Himachal.

We are happy to confirm after implementation that M/S TRL's iMAAP RADMS application is state-of-the-art and is based on decade's road safety research and on-ground implementation experiences across the world. The software is very user-friendly, robust and flexible to meet Himachal State conditions. The project involved development of Web based iMAAP RADMS application for analysing the crash data being collected in real time through 273 mobile tablets distributed across the State. Apart from the iMAAP software, the project was successful due to the specialist implementation team from TRL with experts from road safety, policing, emergency & trauma care and IT specialists. The project included significant road safety capacity building and training components to make this initiative sustainable in the long run.

Dated:-

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

(R.K. Verma)
Chief Engineer-cum-Project Director,
State Roads Project, HPRIDC,
Nirman Bhawan, Nigam Vihar,
Shimla-171002.

Project Director
K.S.T.P., PWD
Trivandrum

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2.7 Technical Information – Standard Forms [Experion Technologies]

1.	Number of contract - 1
	Name of Contract - **Development of 23 HDM-4 reports using Active Reports**
	Country – **United Kingdom**
2.	Name of Purchaser – **TRL Limited**
3.	Purchaser Address - **Crowthorne House, Nine Mile Ride, Wokingham, Berkshire, RG40 3GA, United Kingdom**
4.	Nature of Information Systems and special features relevant to the contract for which the bidding documents are issued: *This is a part of the HDM-4 Re-engineering project. The objective of this project is to develop 23 standard reports using ActiveReports tool by referring the shared Crystal Reports templates and deliver these ActiveReports templates with HDMGlobal for integrating the same with the latest version of the HDM-4 tool. The 23 reports identified were,* • *AADT for section alternatives* • *AADT for project alternatives* • *Average Roughness by Project (Graph)* • *Average Roughness by Section (Graph)* • *Pavement Condition (Bituminous Pavements)* • *Pavement Condition (Concrete Pavements)* • *Pavement Condition (Unsealed Pavements)* • *Pavement Condition Summary* • *Road Works Summary (by Section)* • *Road Works Summary (by Year)* • *MT RUC Summary per veh-km by Vehicle (Graph)* • *MT Vehicle Operating Speed Averages (Graph)* • *Economic Indicators Summary* • *Road Agency and User Cost Streams (Discounted)* • *Road Agency and User Cost Streams (Undiscounted)* • *Optimum Section Alternatives (Constrained Budget)* • *Optimum Section Alternatives (Unconstrained Budget)* • *Pavement Surface Condition Summary by Budget Scenario* • *Roughness: Average for Road Network by Budget Scenario* • *Work Programme Optimised by Section* • *Work Programme Optimised by Year* • *Work Programme Unconstrained by Section* • *Work Programme Unconstrained by Year*
5.	Contract Role - ***Subcontractor***
6.	Amount of the total contract/ subcontract/ partner share (in specified currencies at completion or at date of award for current contracts) **GBP 9,100**

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7.	Equivalent amount US$ Total Contract: **$11,975** Subcontract: $ Partner Share: $
8.	Date of award/ completion: **05-Sep-2019/ 11-Oct-2019**
9.	Contract was completed _____ months ahead/ behind original schedule (if behind, provide explanation) – N/A
10.	Contract was completed _____equivalent under/over original contract amount (if over, provide explanation) – N/A
11.	Special contractual/ technical requirements - None
12.	Indicate the approximate percent of total contract value (and US$ amount) of Information System undertaken by subcontract, if any, and the nature of such information system

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Project Director
K.S.T.P., PWD
Trivandrum

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1.	Number of contract - 2
	Name of Contract - **Development of iROADS PFI Module**
	Country – **United Kingdom**
2.	Name of Purchaser – **TRL Limited**
3.	Purchaser Address - **Crowthorne House, Nine Mile Ride, Wokingham, Berkshire, RG40 3GA, United Kingdom**
4.	Nature of Information Systems and special features relevant to the contract for which the bidding documents are issued *Amey PLC is responsible for upgrading and maintaining the condition of our city's roads, pavements, street lights, bridges and other items on or around the streets. The overall worth of the maintenance contract is £2bn.* *Amey PLC approached TRL for developing a the PFI module within iROADS which allows the customers to calculate the road condition indices from the condition data collected as part of various surveys, and produce reports based on the calculated condition indices.*
5.	Contract Role - ***Subcontractor***
6.	Amount of the total contract/ subcontract/ partner share (in specified currencies at completion or at date of award for current contracts) GBP 46,000
7.	Equivalent amount US$ Total Contract: $60,534 Subcontract: $ Partner Share: $
8.	Date of award/ completion: **27/08/2018 & 29/11/2018**
9.	Contract was completed _____ months ahead/ behind original schedule (if behind, provide explanation) – N/A
10.	Contract was completed _____ equivalent under/over original contract amount (if over, provide explanation) – N/A
11.	Special contractual/ technical requirements - None
12.	Indicate the approximate percent of total contract value (and US$ amount) of Information System undertaken by subcontract, if any, and the nature of such information system

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000224

1.	Number of contract - 3
	Name of Contract – ***iROADS Support and Maintenance***
	Country – ***United Kingdom***
2.	Name of Purchaser – ***TRL Limited***
3.	Purchaser Address - ***Crowthorne House, Nine Mile Ride, Wokingham, Berkshire, RG40 3GA, United Kingdom***
4.	Nature of Information Systems and special features relevant to the contract for which the bidding documents are issued. *The scope of work in this contract was to provide software support for the following customers - TfL, Isle of Wight (IOW), Nigeria, and Sheffield – in TRL's road asset management software named iROADS which was being used by multiple clients for road maintenance management.* *The scope of work included Experion to provide support for iROADS application hosted in TRL production server. Support activities will be conducted at Experion office premises in Kerala, which involve the following:* • *Resolving problems in the production environment using remote access provided by TRL to the iROADS servers; All these activities shall be done based on discussion with TRL. This will include:* o *License-updates, in case of license expiry for any clients.* o *Fixing defects in the Software, after discussion* o *Keeping the client informed about the progress of the support request* o *Preparation and Submission of Quarterly Support and Maintenance* Reports to TRL.
5.	Contract Role – ***Sub-contractor***
6.	Amount of the total contract/ subcontract/ partner share (in specified currencies at completion or at date of award for current contracts) Currency **GBP 15,000**
7.	Equivalent amount US$ Contract: **$ 19,739**
8.	Date of award/ completion: **01-Aug-2018/ Ongoing**
9.	Contract was completed _____ months ahead/ behind original schedule (if behind, provide explanation) – N/A
10.	Contract was completed _____ equivalent under/over original contract amount (if over, provide explanation) – N/A
11.	Special contractual/ technical requirements - None

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12.	Indicate the approximate percent of total contract value (and US$ amount) of Information System undertaken by subcontract, if any, and the nature of such information system

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1.	Number of contract - 4
	Name of Contract – ***iMAAP & iROADS Re-engineering***
	Country – ***United Kingdom***
2.	Name of Purchaser – ***TRL Limited***
3.	Purchaser Address - ***Crowthorne House, Nine Mile Ride, Wokingham, Berkshire, RG40 3GA, United Kingdom***
4.	Nature of Information Systems and special features relevant to the contract for which the bidding documents are issued *The scope of this project was to migrate the iMAAP Silverlight application as well as the iROADS application into a new, modern, HTML5 based technology stack. The objective was to develop a new, refreshed product and deliver value to the customers through the product.*
5.	Contract Role - **Subcontractor**
6.	Amount of the total contract/ subcontract/ partner share (in specified currencies at completion or at date of award for current contracts) Currency **GBP 86,000**
7.	Equivalent amount US$ 113,173
8.	Date of award/ completion: **15-Nov-2017 & 31-Mar-2018**
9.	Contract was completed _____ months ahead/ behind original schedule (if behind, provide explanation) – N/A
10.	Contract was completed _____ equivalent under/over original contract amount (if over, provide explanation) – N/A
11.	Special contractual/ technical requirements - None
12.	Indicate the approximate percent of total contract value (and US$ amount) of Information System undertaken by subcontract, if any, and the nature of such information system

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000227

1.	Number of contract - 5
	Name of Contract – **iMAAP [Road Safety Management System] for Himachal Pradesh**
	Country – **India**
2.	Name of Purchaser – **TRL Limited**
3.	Purchaser Address - **Crowthorne House, Nine Mile Ride, Wokingham, Berkshire, RG40 3GA, United Kingdom**
4.	Nature of Information Systems and special features relevant to the contract for which the bidding documents are issued. *The main objective of the project is to successfully implement and maintain a Road Accident Data Management System (RADMS) for the State of Himachal Pradesh in India. The system is intended to manage accident data, produce routine statistics, conduct road safety analysis, and produce a variety of reports.* *The scope of work included:* • *To provide and implement a GIS -based computerised software system for accident recording, storage, analysis and dissemination;* • *To assist in establishment of a centralised Accident Data Management Cell (ADMC) and set up an acceptable database;* • *To provide one year operational support after full rollout of the system in the State;* • *To conduct training amongst the police, highway engineers and other stake holders and establish an on-going stakeholder driven training program for sustaining the RADMS implementation.*
5.	Contract Role (check one) – **JV Partner [TRL was the lead partner]**
6.	Amount of the total contract/ subcontract/ partner share (in specified currencies at completion or at date of award for current contracts) Currency INR **66,89,288**
7.	Equivalent amount **US$ 94,112**
8.	Date of award/ completion: **26-Feb-2014 & 25-Feb-2016**
9.	Contract was completed _____ months ahead/ behind original schedule (if behind, provide explanation) – N/A
10.	Contract was completed _____ equivalent under/over original contract amount (if over, provide explanation) – N/A
11.	Special contractual/ technical requirements - None
12.	Indicate the approximate percent of total contract value (and US$ amount) of Information System undertaken by subcontract, if any, and the nature of such information system

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Project Director K.S.T.P., PWD Trivandrum

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1.	Number of contract - 6
	Name of Contract – ***Annual Maintenance Support for iMAAP [2016-19]***
	Country – ***United Kingdom***
2.	Name of Purchaser – ***TRL Limited***
3.	Purchaser Address - ***Crowthorne House, Nine Mile Ride, Wokingham, Berkshire, RG40 3GA, United Kingdom***

4.	Nature of Information Systems and special features relevant to the contract for which the bidding documents are issued
	The scope of this project is to provide support and maintenance services for the iMAAP HP project. The scope of the software support and maintenance is as below-
	• *Consultant shall deploy two IT project assistants having exposure to iMAAP RADMS system, for necessary operational support coordination and assistance at Shimla (HP).*
	• *Support analysing the RADMS data reported by HPRIDC and other stakeholders.*
	• *Attend any relevant inquiries coming from stakeholders regarding the usage of the system, and provide assistance to them.*
	• *Support with development of various reports including accident data analysis*
	• *Routine health check of the system including the following sub-activities:*
	  • *Verification of CPU usage, Memory usage and HDD Space usage for*
	  • *Application Server*
	  • *Database Server*
	  • *Verification of RADMS application health*
	  • *Verification of RADMS user access statistics*
	  • *Verification of availability of GIS services*
	  • *Backup RADMS Application and Database*
	  • *Shrink database log files*
	  o *Recycle IIS Application Pool*
	  o *Remove temporary application files*
	• *Providing monthly support and maintenance reports to HPSRP (Himachal Pradesh State Road Project)*

5.	Contract Role – ***JV Partner [TRL was the lead partner]***
6.	Amount of the total contract/ subcontract/ partner share (in specified currencies at completion or at date of award for current contracts) **Currency *INR 5,926,000***
7.	Equivalent amount ***US$ 83,373***
8.	Date of award/ completion: ***01-Jul-2016 & 31-Sep-2019***
9.	Contract was completed ____ months ahead/ behind original schedule (if behind, provide

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	explanation) – N/A
10.	Contract was completed _____ equivalent under/over original contract amount (if over, provide explanation) – N/A
11.	Special contractual/ technical requirements - None
12.	Indicate the approximate percent of total contract value (and US$ amount) of Information System undertaken by subcontract, if any, and the nature of such information system

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000230

1.	Number of contract - 7
	Name of Contract – ***SCOOT Urban Traffic Control Software Development Services***
	Country – ***United Kingdom***
2.	Name of Purchaser – ***TRL Limited***
3.	Purchaser Address - ***Crowthorne House, Nine Mile Ride, Wokingham, Berkshire, RG40 3GA, United Kingdom***
4.	Nature of Information Systems and special features relevant to the contract for which the bidding documents are issued *SCOOT is an online signal timing optimiser software tool developed by TRL. SCOOT has proved to be an effective and efficient tool for managing traffic on signalised road networks and is now used in over 250 towns and cities in the UK and overseas. SCOOT uses data from vehicle detectors and optimises traffic signal settings to reduce vehicle delays and stops.* *TRL is now to modernising the SCOOT software tool with the support from Experion. The Scope of the work includes,* • *Collect and analyse the requirements and prepare system specifications* • *Develop new UI Screens for SCOOT Application* • *Develop new modules/features for SCOOT Application* • *Provide automation and manual testing support*
5.	Contract Role (check one) - ***Subcontractor***
6.	Amount of the total contract/ subcontract/ partner share (in specified currencies at completion or at date of award for current contracts) Currency ***GBP 65,995***
7.	Equivalent amount ***US$ 87,245***
8.	Date of award : ***06-Jan-2019 & Ongoing***
9.	Contract was completed _____ months ahead/ behind original schedule (if behind, provide explanation) – N/A
10.	Contract was completed US$ _____ equivalent under/over original contract amount (if over, provide explanation) – N/A
11.	Special contractual/ technical requirements - None
12.	Indicate the approximate percent of total contract value (and US$ amount) of Information System undertaken by subcontract, if any, and the nature of such information system

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000231

1.	Number of contract - 8
	Name of Contract – ***Smart Mobility Living Lab (SMLL)***
	Country – ***United Kingdom***
2.	Name of Purchaser – ***TRL Limited***
3.	Purchaser Address - ***Crowthorne House, Nine Mile Ride, Wokingham, Berkshire, RG40 3GA, United Kingdom***
4.	Nature of Information Systems and special features relevant to the contract for which the bidding documents are issued *SMLL is the world's most advanced urban testbed for connected and autonomous vehicles (CAVs) of its kind, using public and private roads in London to develop and validate new mobility and transport technologies in a real-world connected environment.* *The scope of work is to customise the TRL's commercial off-the-shelf software iMAAP and iROADS for Incident & Asset Data Visualisation for SMLL.*
5.	Contract Role - ***Subcontractor***
6.	Amount of the total contract/ subcontract/ partner share (in specified currencies at completion or at date of award for current contracts) Currency **GBP 49400**
7.	Equivalent amount **US$ 65,306**
8.	Date of award : **01/11/2019 & Ongoing**
9.	Contract was completed _____ months ahead/ behind original schedule (if behind, provide explanation) – N/A
10.	Contract was completed US$ _____ equivalent under/over original contract amount (if over, provide explanation) – N/A
11.	Special contractual/ technical requirements - None
12.	Indicate the approximate percent of total contract value (and US$ amount) of Information System undertaken by subcontract, if any, and the nature of such information system

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000232

1.	Number of contract - 9
	Name of Contract – ***Supply and Installation of "Out of the Box" Software Product for Road Safety Management in the State of Kuwait***
	Country – ***Kuwait***
2.	Name of Purchaser – ***TRL Limited***
3.	Purchaser Address - ***Crowthorne House, Nine Mile Ride, Wokingham, Berkshire, RG40 3GA, United Kingdom***
4.	Nature of Information Systems and special features relevant to the contract for which the bidding documents are issued *The scope of work was to supply, customize, install, implement and support an "Out of the Box" software system to enhance Road Safety Management and assist in the planning, implementation and management of a sustainable transport system in Kuwait.* *The system has replaced current manual data collection practices and limited information services. It should electronically gather, process, analyse and display information related to the road network, traffic operations, accidents, black spots, traffic police patrol vehicles, offences, monitoring and evaluation, and relevant issues with Geographical Information System (GIS).The information has been made available through website access and mobile phones to permit reports and publications to be generated by a wide audience, including planners, engineers, researchers, government officials, students, NGOs, academics, political leaders, decision makers, and the community.*
5.	Contract Role - ***Subcontractor***
6.	Amount of the total contract/ subcontract/ partner share (in specified currencies at completion or at date of award for current contracts) Currency **GBP 278,050**
7.	Equivalent amount **US$ 366,604**
8.	Date of award/ completion: **01-Jul-2015 & 15-Dec-2017**
9.	Contract was completed _____ months ahead/ behind original schedule (if behind, provide explanation) – N/A
10.	Contract was completed _____ equivalent under/over original contract amount (if over, provide explanation) – N/A
11.	Special contractual/ technical requirements - None
12.	Indicate the approximate percent of total contract value (and US$ amount) of Information System undertaken by subcontract, if any, and the nature of such information system

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Project Director
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000233

1.	Number of contract - 10
	Name of Contract – ***Professional Consultancy Services for National Crash (Accident) Database***
	Country – ***Qatar***
2.	Name of Purchaser – ***TRL Limited***
3.	Purchaser Address - ***Crowthorne House, Nine Mile Ride, Wokingham, Berkshire, RG40 3GA, United Kingdom***
4.	Nature of Information Systems and special features relevant to the contract for which the bidding documents are issued *The direct Client for this project (PWA / Ashghal) has a very clear and important responsibility for road safety delivery, especially, but not exclusively, in the areas of engineering and infrastructure provision.* *The main tasks that are to be achieved are to:* • *Implement an effective road crash data system that makes reliable and precise data available to all the main stakeholders in Qatar.* • *provide the capability to use map based analyses (GIS) so that hazardous locations (blackspots) across the network can be identified and thus treated effectively;* • *Make the software solution capable of utilising and where possible integrate with other data sources and databases, including sources medical casualty data, traffic flows, official vehicle register details, vehicle defect history and insurance records;* • *Develop improved methodologies and training which will have the potential to significantly improve the data quality, so that the information for records are more reliable and comprehensive;* • *Support the capacity of a range of local staff to make full use of the available data and the software solution to support road safety strategy development through development a range of supporting materials, including training resources and manuals;*
5.	Contract Role - ***Subcontractor***
6.	Amount of the total contract/ subcontract/ partner share (in specified currencies at completion or at date of award for current contracts) Currency ***INR 78,45,268***
7.	Equivalent amount US$ 110,375
8.	Date of award/ completion: ***10-Aug-2015 & 09-Aug-2018***
9.	Contract was completed _____ months ahead/ behind original schedule (if behind, provide explanation) – N/A
10.	Contract was completed _____ equivalent under/over original contract amount (if over,

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	provide explanation) – N/A
11.	Special contractual/ technical requirements - None
12.	Indicate the approximate percent of total contract value (and US$ amount) of Information System undertaken by subcontract, if any, and the nature of such information system

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Trivandrum

000235

1.	Number of contract - 11
	Name of Contract – ***iMAAP for Mauritius***
	Country – ***Mauritius***
2.	Name of Purchaser – ***TRL Limited***
3.	Purchaser Address - ***Crowthorne House, Nine Mile Ride, Wokingham, Berkshire, RG40 3GA, United Kingdom***
4.	Nature of Information Systems and special features relevant to the contract for which the bidding documents are issued *The primary objective of this project is to replace current manual data collection processes followed in Mauritius currently and implement an Road safety management system.*
5.	Contract Role (check one) - ***Subcontractor***
6.	Amount of the total contract/ subcontract/ partner share (in specified currencies at completion or at date of award for current contracts) Currency **GBP 80,360**
7.	Equivalent amount **US$ 105751**
8.	Date of award/ completion: ***08-Jan-2018 & Ongoing***
9.	Contract was completed _____ months ahead/ behind original schedule (if behind, provide explanation) – N/A
10.	Contract was completed _____ equivalent under/over original contract amount (if over, provide explanation) – N/A
11.	Special contractual/ technical requirements - None
12.	Indicate the approximate percent of total contract value (and US$ amount) of Information System undertaken by subcontract, if any, and the nature of such information system

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000236

1.	Number of contract - 12
	Name of Contract – ***Consultancy Service for the Provision of a Road Accident Data Management System (RADMS)***
	Country – ***Ghana***
2.	Name of Purchaser – ***TRL Limited***
3.	Purchaser Address - ***Crowthorne House, Nine Mile Ride, Wokingham, Berkshire, RG40 3GA, United Kingdom***
4.	Nature of Information Systems and special features relevant to the contract for which the bidding documents are issued *The scope of work was to implement a web-based state-of-the-art Road Accident Data Management System (RADMS) that can manage crash/injury data, assist in doing different types of data analyses which can identify hazardous trends, monitor road safety performance and strategies to improve road safety.* *In order to implement this solution, the consortium of Transport Research Laboratory (TRL) and Bridges & Road Research Institute (BRRI) has been chosen as consultants with the funding from European Development Fund (EDF).* *Experion's role in this project was to customise and implement the iMAAP application for Ghana and provide system training to the users.*
5.	Contract Role - ***Subcontractor***
6.	Amount of the total contract/ subcontract/ partner share (in specified currencies at completion or at date of award for current contracts) Currency GBP 52,500 Currency Currency
7.	Equivalent amount ***US$ 69,088***
8.	Date of award/ completion: ***10-Sep-2018 & 10-Dec-2018***
9.	Contract was completed _____ months ahead/ behind original schedule (if behind, provide explanation) – N/A
10.	Contract was completed _____ equivalent under/over original contract amount (if over, provide explanation) – N/A
11.	Special contractual/ technical requirements - None
12.	Indicate the approximate percent of total contract value (and US$ amount) of Information System undertaken by subcontract, if any, and the nature of such information system

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000237

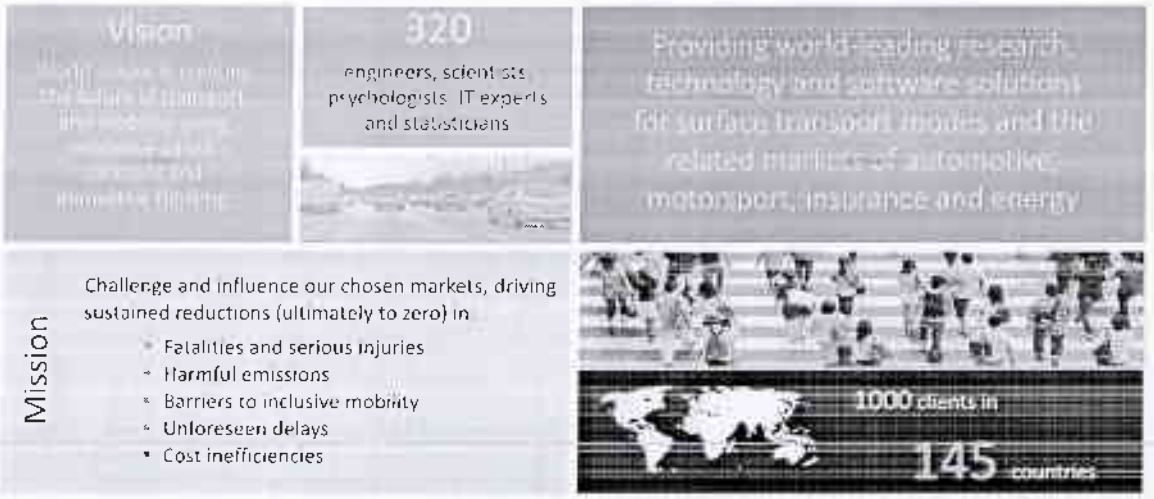
2.8 Technical Information – TRL & Experion

2.8.1 TRL Overview

TRL Limited, UK is one of the largest and most comprehensive independent transport safety and mobility centres in the world. Established over 80 years ago, TRL's expertise is built around decades of research that has provided a robust evidence-base for providing our clients with best practice road safety solutions, innovation and impartial advice.

Our clients include national and regional Government agencies as well as International Funding Institutes, such as the World Bank. We have delivered projects in every continent of the world (the extent of which is demonstrated in the figure below), with seven of our projects being delivered in India in the last 10 years.

TRL has an international reputation for carrying out world class road safety consultancy and research to meet the challenges presented by transport. Our experience in these broad technical areas ensures that the TRL project team has the core strengths to deliver a successful project of this type.



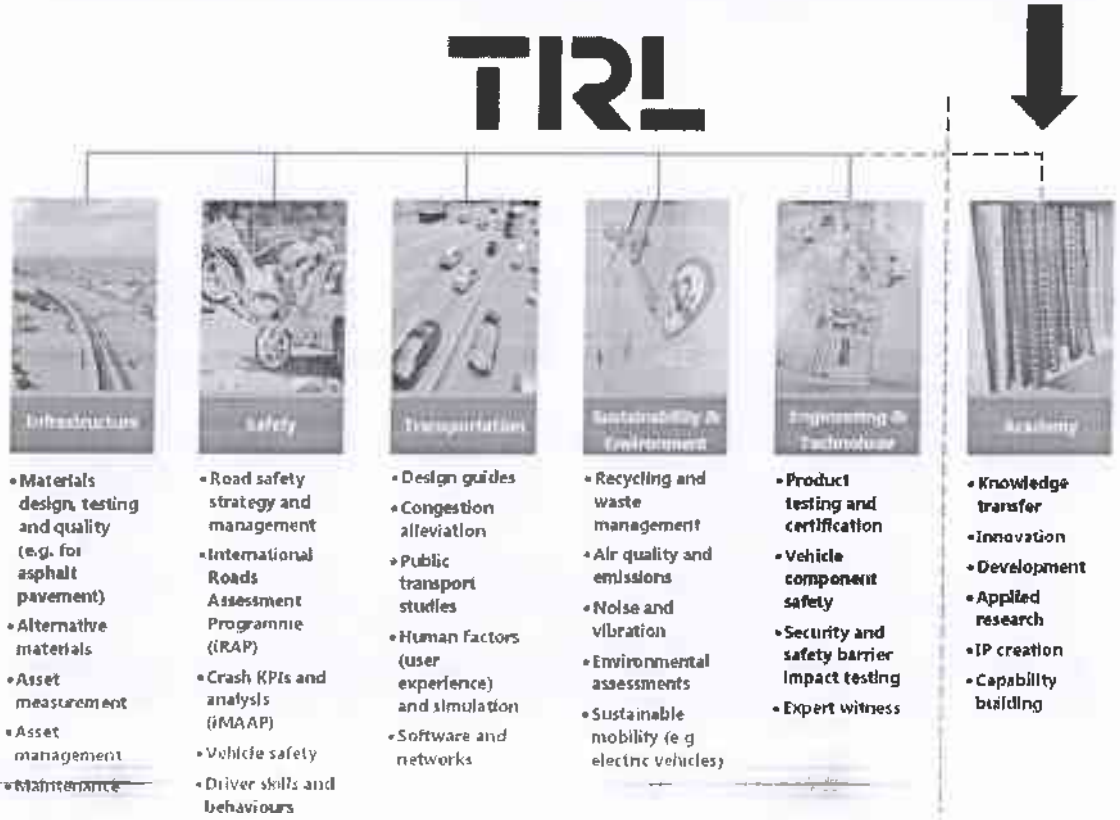
TRL's clients include national and regional Governmental agencies as well as International Funding Institutes, such as the World Bank. We have delivered projects in every continent of the world. Almost all of TRL's assignments include an element of training, mentoring and capacity building to ensure that our clients and stakeholders obtain the grounding skills to adopt a shared responsibility for improving road safety, as specified in the Safe System philosophy.

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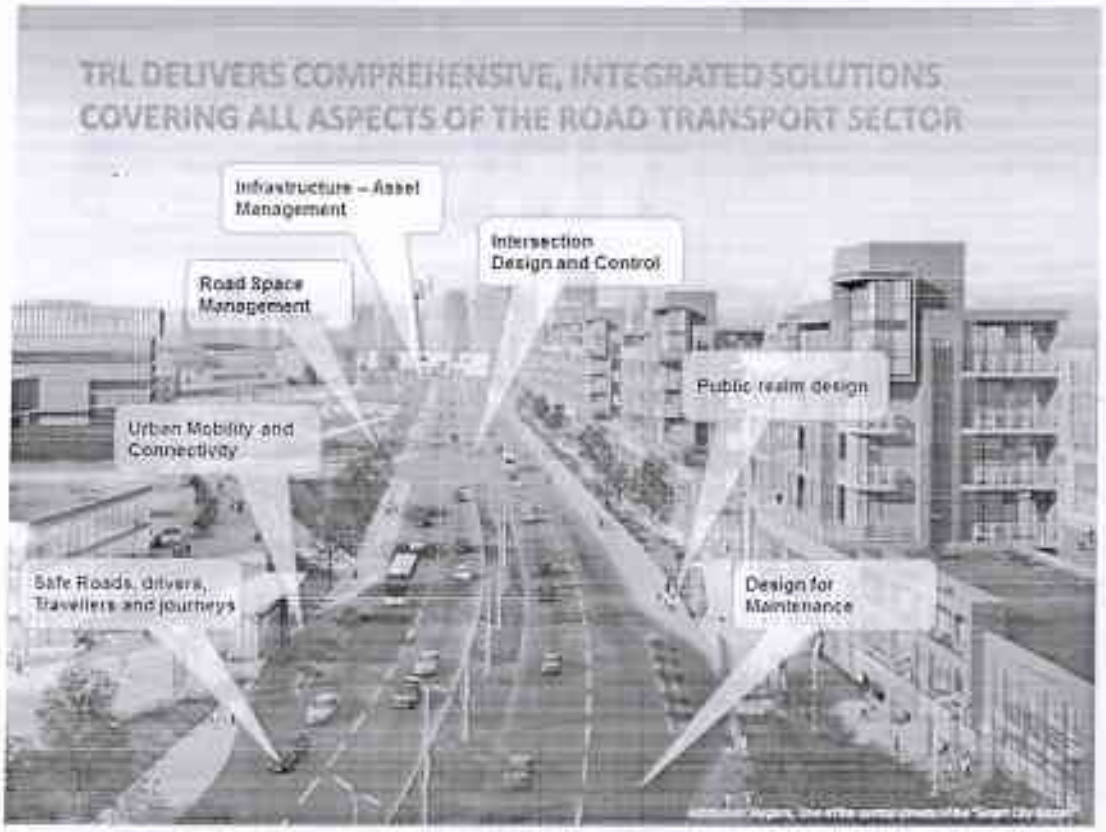
TRL offers a wide range of services spanning all major transport disciplines with a constant focus on knowledge transfer through the TRL Academy



TRL's experience in these technical areas ensures that the project team has the core strengths to deliver a successful solution, unlike an IT vendor who will produce an IT/GIS solution.

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TRL has helped to shape the modern road environment across the world through the delivery of high-quality projects and through the development of guidance, policy, manuals and strategies in all aspects of infrastructure, safety and transportation. TRL has also been involved in the European Road Assessment Programme (EuroRAP) and International Road Assessment Programme (iRAP) since their inception and play a significant role in the development of the iRAP methodology and models, particularly in estimating casualty numbers from road characteristic data. We are currently delivering an iRAP assessment in the State of Qatar. TRL has recently become an iRAP Centre of Excellence.

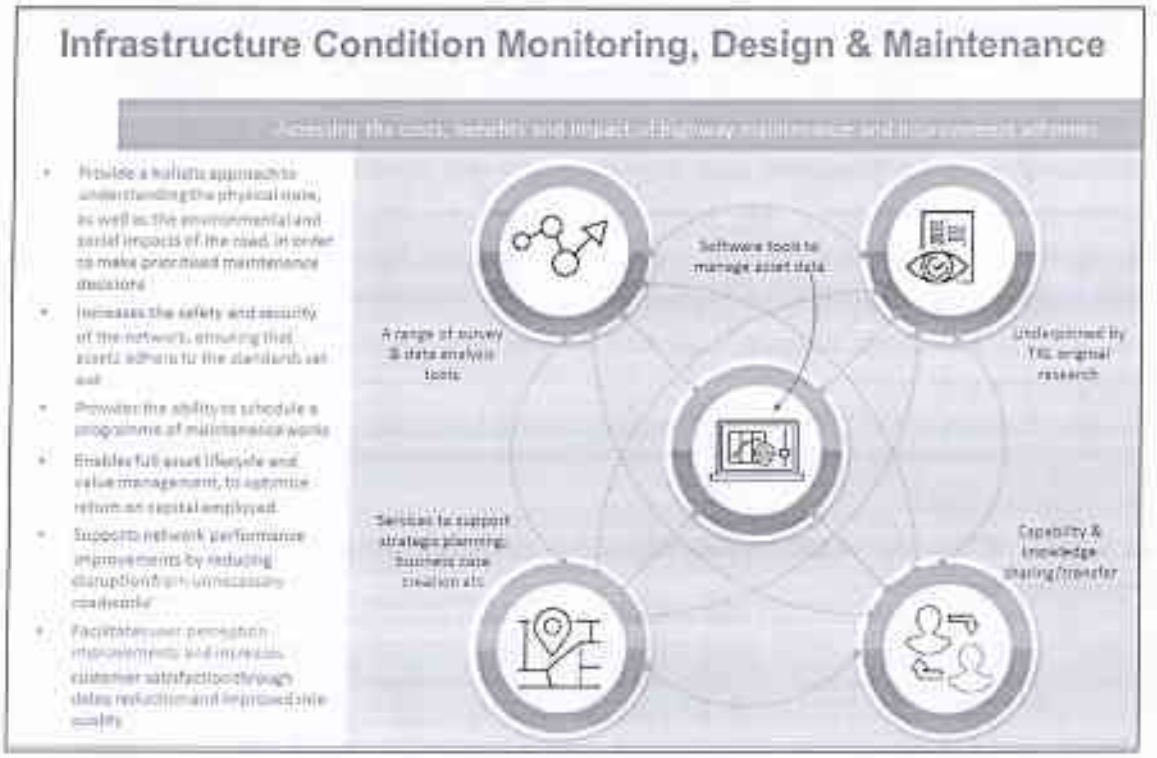
2.8.2 TRL and Road Asset Management

TRL has a long history, implementing Road Maintenance Management Systems (RMMS) and has been at the forefront of data collection technologies for over 80 years. TRL's work in maintenance management work is supported by an extensive body of research which has been undertaken over several decades and in numerous countries, on how to obtain the best value from planned and systematic maintenance of major capital infrastructure. We developed the earliest software tools, such as the RTIM investment model for use in highway and maintenance planning, and were involved in the development of the World Bank HDM-4 standards.

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In terms of data collection to support decision making, routine investigation tools such as the British Pendulum tester and SCRIM which are used to measure friction (skid resistance) were both invented by TRL and TRL were amongst the first organisations to investigate the use of laser technology to define the surface condition of paved assets. More latterly TRL has pioneered the use of traffic speed deflection at the network level and has been called upon by the Conference of European Directors of Roads (CEDR) to provide guidance on how the latest survey tools like TSD, GPR and 3D laser measurement should be used to assess pavement performance.

CIHT/VINCI Concessions Asset Management Award

Winner: *The Traffic-Speed Structural Survey of the Strategic Road Network* - TRL and Highways England



Until recently, it was only possible to measure pavement structural condition using disruptive slow speed techniques, preventing network level assessment. A development programme sponsored by Highways England, with research undertaken by TRL, has delivered a network survey called the Traffic Speed Structural Survey (TRASS), which utilises a new device called the Traffic-speed Deflectometer (TSD).

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http://www.ciht.org.uk/en/events/ciht-awards/ciht-awards-2016/ciht-awards-2016-winners.cfm

In the UK, TRL has worked closely with the Highways England (formerly Highways Agency) and Department for Transport over many years in the field of asset management and maintenance optimisation. We have also worked on numerous international asset management projects, using various systems such as Road Mentor, RDM and HDM-4. This wide ranging asset management experience, and the knowledge we have gained of end-user needs, has been brought together in the development of our iROADS Asset Management software.

Why TRL?
TRL – Our strengths
80 years of history, track-record and best practices in Infrastructure Asset Management.
Global thought-leaders in **Road Asset Data Collection & Management**
Our products are used Worldwide and assist in the management of 100,000 KM of highway network; we are not a software company who does projects alone. We are asset management practitioners who use our products globally in asset management
Globally used, research based and proven Road Asset Management System – iROADS. Intellectual Property (IP) is owned, managed, developed and controlled by TRL.
Projects are led and delivered by TRL subject matter experts – TRL's own staff.
TRL is a lead technical partner of **HDMGlobal** and has been responsible for the management and development of HDM-4.
Delivery capacity & dedicated team – TRL will be focussing only on this asset management project in India during its execution, unlike many consultants who have multiple projects in India with same team which are struggling to deliver

2.8.3 Road Asset Management System 'iROADS' from TRL

iROADS is a GIS-based custom off the shelf asset management system fully developed within TRL that can be adapted, customised and further developed to meet new and more demanding customer needs. iROADS provides a comprehensive system for road owners, operators and authorities to manage all their road assets in a single system. With inbuilt mapping, comprehensive analyses for maintenance programmes, deterioration modelling, whole life costing and lifecycle analysis, and extensive reporting functionality it is configurable for all types of assets from modern design highways.

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- Reduced life-cycle costs
- Defined levels of service
- The ability to track performance
- Improved transparency in decision making
- The ability to predict the consequences of funding decisions
- Decreased financial, operational and legal risk
- Ability to discharge statutory valuation and financial reporting responsibilities

Business benefits of iROADS Maintenance Management Solution

iROADS meets a wide range of requirements for asset management for virtually all roads and all roads owners and operators. Having partnered with Local and national roads authorities, owners and operators across the globe, TRL has identified most of the needs and requirements for a full asset management system implementation that meets our client's business, political and user perception needs for optimising the management and maintaining all their highway network assets to high standard levels.



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2.8.4 Mobile Asset Data Management Solution 'iCAPTURE' from TRL

The iCAPTURE suite is a mobile survey collection software that supports Windows based tablet systems. The on-site software integrates with iROADS to facilitate the acquisition of mobile data collection. The iCAPTURE software is used by site operators in support of Risk Analysis and Value Management surveys.



2.8.5 Road Asset Data Collection Solution 'iCOLLECTOR' from TRL



iCOLLECTOR is a comprehensive suite of road asset survey solutions from TRL. iCOLLECTOR provides cutting edge road survey technologies that have been developed by TRL to serve to the demands of nearly all road types and conditions enabling survey teams to rapidly collect and analyse road asset data. As good quality data is pivotal to the success of a road asset management system (RAMS), data collection using automated and rapid technologies result in effective RAMS implementations.

The iCOLLECTOR suite comprises of three major technologies:

TRL's Data Collector – A digital data logging system designed with precision in mind. The Data-Collector captures the road roughness (IRI) through its inertial measurement systems. Road roughness is a key parameter in many road investment decision support tools such as the World Bank's HDM-4 software. When Data-Collector is used in combination with other instruments, such as the Image-Collector and Profile-Collector, it precisely aligns the

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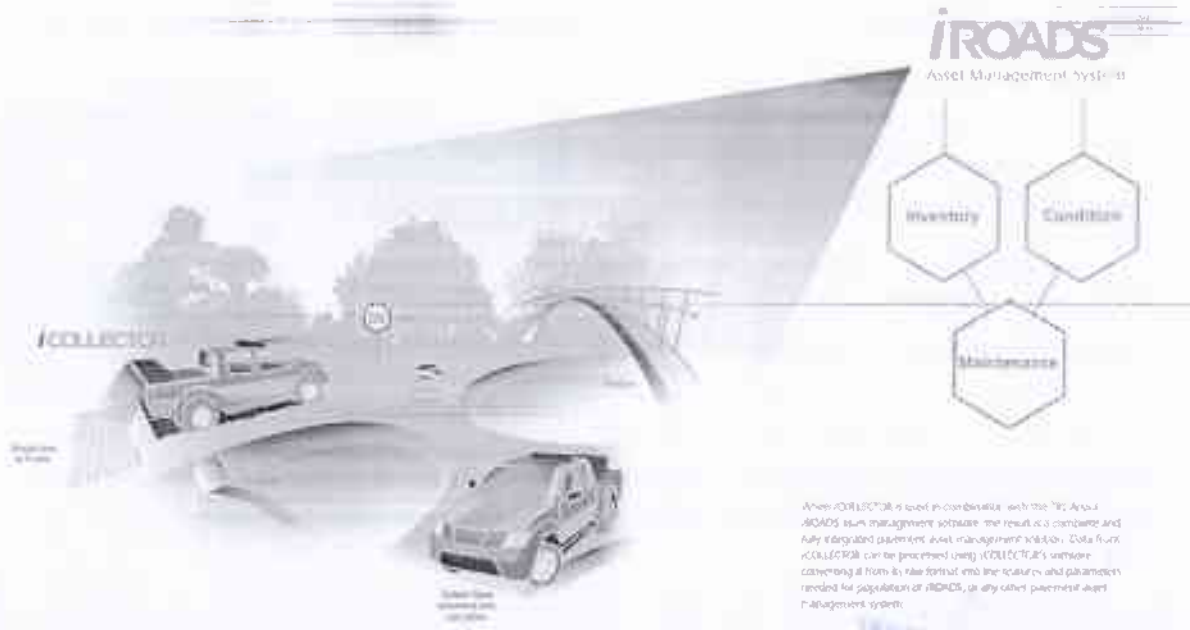
captured information in time and space removing any second guessing when it comes to interpretation.

TRL's Image-Collector – This forward facing imaging system provides high definition images of the road network from which inventory information can be sourced and road defects clearly identified.

TRL's Profile-Collector – Captures the horizontal and longitudinal profile of the road allowing the precise location and severity of many common defects to be determined. The profile data can be used to examine key parameters that affect road performance such as crossfall and road surface deformations e.g. rutting and short wavelength undulations.

The iCOLLECTOR suite is modular by design and can be tailored to collect the precise asset inventory and condition data that is required. Furthermore, if you have a requirement for measurement equipment, then our team of expert technologists can be engaged to adapt or develop bespoke systems capable of meeting your needs.

When iCOLLECTOR is used in combination with the TRL's RAMS solution iROADS asset management software, the result is a complete and fully integrated pavement asset management solution. Data from iCOLLECTOR can be processed using iCOLLECTOR's software converting it from its raw format into the features and parameters needed for population of iROADS, or any other pavement asset management system.

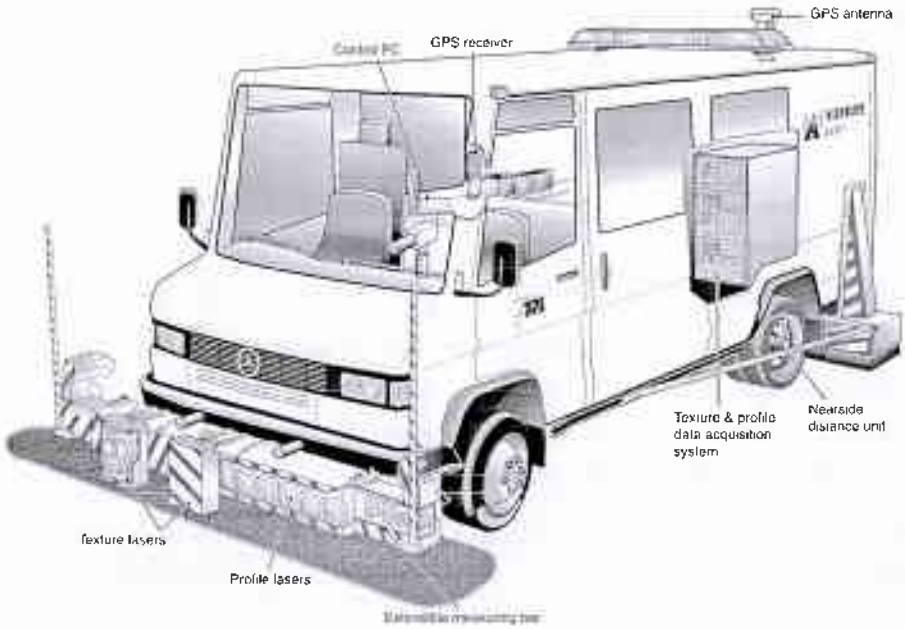


2.8.6 iRAP and Highways England Asset and Road Condition Work

TRL have been at the heart of developing cutting edge road asset and road condition survey systems, databases and analyses systems for highways England and its predecessor the Highways Agency. TRL has also managed these vital systems for Highways England and we

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continue to provide significant support. We developed HAPMS (The Highways Agency Pavement Management System) and high speed data collection systems such as HARRIS.



We have also been involved in developing and drawing up the specifications for the main road management system: SCANNER for Local authorities who are responsible for the condition and safety of other rural roads.



TRL has been and remains the leading transport research and consultancy organisation in the UK providing knowledge based solutions to governments, road owners and operators. In addition, TRL has defined the requirements for best practice in asset management and the supporting processes and methods to achieve them, developing asset management tools and systems and delivering these to owners and operators.

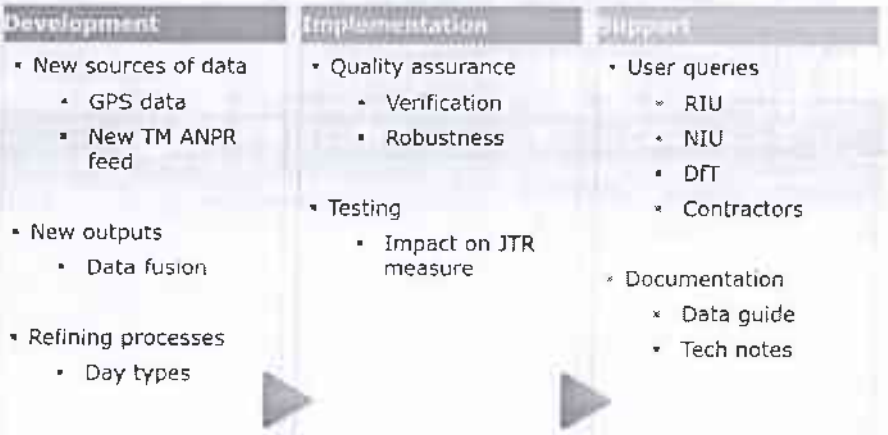
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HATRIS Technical Consultancy

TRL's current role is wide-ranging and covers three key areas:



Most recently TRL has run the innovative iRAP safety Star Rating system across the Highways England Strategic Network, which entailed coding road features from the client's asset survey imagery dataset. The project also made use of the asset GIS layers to automatically code features.

2.8.7 TRL and HDM-4

In the early 1970's, TRL, with the World Bank and others was instrumental in promoting the worldwide realization of the vital importance of planned and systematic maintenance of major capital infrastructure. We developed the earliest tools, such as the Road Transport Investment Model (RTIM) for use in highway and maintenance planning, and were involved in the development of HDM-4, with specific reference to the technical relationships included in the program and the development of a global training and dissemination strategy. We bring an unrivalled experience both in the development and application of investment models in selecting optimal treatment and investment strategies.

As part of the updating of HDM III to HDM 4, TRL took part in the International Study of Highway Development and Management (ISOHDM). This included updating the technical relationships, operating software and computing technology.

Over the past 10 years the consortium HDMGlobal HDMGLOBAL has been responsible for the management and development of HDM-4 under the auspices of the World Road Congress (PIARC). TRL is a partner of the HDMGlobal consortium and is represented by Dr Greg Morosiuk on its management board.

TRL are directly responsible for:

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- Drawing up the specifications for the road deterioration and works effects models in the software and producing the associated documentation (Volume 6)
- Producing Volume 2 of the HDM-4 series of publications, Applications Guide, detailing example case studies in the HDM-4 software
- Development of a user training programme to be adopted worldwide



- Organising and delivering HDM-4 training courses in the UK and overseas

TRL has substantial experience implementing HDM-4 internationally and the development of asset management strategies based on the application of HDM-4. TRL developed a Road Asset Management System (RAMS) comprising a centralised road database entitled Road Data Manager (RDM) which is linked to HDM-4. The RDM system stores and processes information on a country's road network. In addition, RDM processes the data to produce a road network export file that can be imported directly into HDM-4. The system has been implemented in Malawi, the Gambia and Mauritius.

More recently TRL have developed a highly flexible and versatile asset management solution comprising iROADS which is a centralised repository for storing, processing, reporting and displaying road network information, and links directly to HDM-4. iROADS can be deployed at different levels ranging from single computers to internet connectivity between offices and hosted in 'the cloud'. iROADS has been implemented in many UK road authorities and more recently overseas in countries such as Nigeria and Uganda.

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TfL, one of the leading road authorities in the world, uses iCAPTURE (iROADS Mobile Application), along with iROADS, for asset data collection

2.8.8 TRL and iRAP

The International Road Assessment Programme (iRAP) is a charitable foundation which is dedicated to the elimination of dangerous roads from the world to obtain significant reductions in fatal and serious road casualties. This is being achieved by identifying poorly designed and constructed roads and developing cost effective programmes of upgrades to significantly reduce the risks to all road users.

TRL has comprehensive knowledge of both the EuroRAP "Risk Mapping" and also the iRAP "Star Rating" methodologies. The Risk Mapping approach is also managed under the iRAP umbrella organisation. Risk Mapping is based on the plotting of fatal and serious crash densities and rates. Star Rating assigns scores to road sections according to the quality of a comprehensive range of physical road attributes.

TRL is an iRAP Centre of Excellence (COE); this status is granted by iRAP and the Road Safety Foundation because TRL has a cell of staff that have a deep understanding of both the theory and practicalities of Risk Mapping and also the Star Rating approach.

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TRL was one of the organisations that was pivotal in developing the iRAP Star Rating methodology, helping to define the fundamental method and approach. We were involved in the initial piloting of the methodology in South Africa. TRL has also had involvement in the continual improvement of the Star Rating algorithms as we have been an active member of the iRAP Global Technical Committee (GTC) for the past ten years. We also have staff who have been involved in developing the main Risk Mapping programme for iRAP/EuroRAP since its inception nearly 20 years ago; we also generate the Risk mapping results for the UK on behalf of iRAP and the Road Safety Foundation.

Recently we have also been engaged in implementing iRAP in Qatar in the Arabian Gulf in a project for Ashghal who manage the strategic road network in the state. We are also currently leading the major and high profile Star rating process which is being applied to the Strategic Highways Network for Highways England.

iRAP Star Rating is an infrustructure based system which uses datasets derived from assett surveys to code physical road features. It also requires a range of data which are typically held by road agencies such as speed and flow data. Data is generally coded from assett survey video in the back office, however coding systems are making more and more use of LIDAR and Assett inventory datasets to score road features more accurately.



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2.8.9 TRL Software

TRL Software is one of the most prolific brands in transportation related software. Our comprehensive suite of Commercial Off the Shelf (COTS) software covers: junction & signal design, traffic & control, strategic modelling, street auditing, safety, economic appraisal and pavement & asset management. We also have extensive experience of developing specialist decision support tools to aid high profile clients such as Highways England (formerly Highways Agency) to get the most out of the asset data sets.

We believe our rich history of transportation research and extensive software development experience sets us apart from other providers as we are able to fully understand the client requirements and effectively modify or develop compressive software solutions using in-house capability and international best practice.

HDM Training

Institutional Strengthening and Training

TRL's expertise has been used in over 60 countries worldwide to develop appropriate and cost effective solutions. Our experience in institutional strengthening and training helps customers develop their own expertise, making their solutions sustainable and tailored to local circumstances. Our work continues to enable government customers to set standards for highway and vehicle design, formulate policies on road safety, transport and the environment, and encourage good traffic engineering practice. The organisation also sells its services to other customers in the UK and overseas, providing fundamental and applied research, working as a contractor, consultant or providing facilities and staff. These customers include local and regional authorities, major civil engineering contractors, transport operators, consultants, industry, foreign governments and international aid agencies.

The scope of training and technology transfer is driven by Customer requirements and the particular objectives of the project. Our capability includes the design and delivery of off-the-shelf courses or tailor made courses, on-the-job training and training within industry or at further education centres. Both this and a larger institutional strengthening component are seen as integral to successful project completion and the development of a sustainable local capacity.

HDM-4 Training

The HDM-4 training courses we undertake are usually one week in duration, comprising formal presentations, demonstrations and exercises in all the HDM-4 functionalities, with the focus on 'hands-on' training. The formal presentations comprise Powerpoint presentations that provide background information on HDM-4 functionalities. The demonstrations involve the trainer running HDM-4 to demonstrate how to use each functionality.

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We strongly believe that the greatest benefit in such a training course is for the trainees to get 'hands-on' experience in using HDM-4 rather than simply watching an experienced HDM-4 trainer demonstrating its use. Therefore we provide exercises for the trainees so that they become confident in using the various functionalities in HDM-4. In order for the trainees to be able to undertake the exercises, HDM-4 training licences need to be installed on their computers for the duration of the course.

The topics that are covered in the training include:

- Configuration for local conditions
- Creating Vehicle Fleets
- Creating Road Networks
- Creating Work Standards
- Conducting Project Analysis
- Conducting Programme Analysis
- Conducting Strategy Analysis
- Calibration of Road Deterioration and Vehicle Operating Cost relationships



TRL provides HDMGlobal certified training on HDM-4. TRL is representative on the HDMGlobal board, who have been awarded the concession for the development and management of HDM-4 version 2. TRL can lead the HDM-4 training for the current project.

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2.8.10 IT Capability at TRL

TRL has an established reputation for research, analysis, recommendations and results through the development of transport and safety software solutions. We have a long history of working with clients to develop and deliver successful software projects for them to use, drawing upon our world class expertise in transport software and in providing data management and analysis tools for government and other clients. We can therefore offer clients our experience both as software developers but also as users of transport data, so we are well placed to understand and deliver the requirements for a wide range of projects.

Much of our research leads to the development of innovative and relevant software solutions, covering transport issues at all scales both in the UK and internationally:

- National: Traffic count management; crash analysis systems; in-depth investigation databases and analysis systems
- Regional: Strategic policy models; motorway flow analysis
- Networks: Network trip generation/analysis; network signal optimisation & control; network safety models
- Community: Environmental assessment; car-share software
- Local: Junction models; traffic light control software

Our Approach to IT and Software Management

TRL's quality assurance system comprises of a suite of procedures, role descriptions, forms and guides covering quality, health, safety and environmental impact. Together they form our Integrated Management System (IMS). This system is based on best practice as promoted by the Association for Project Management. Our project managers are externally trained in these practices and an increasing number are Members of the Association. These procedures are externally audited and accredited to internationally recognised standards:

- BS EN ISO.9001:2008 for quality procedures
- ISO 14001 for environmental Procedures
- OHSAS 18001 for Health and Safety procedures
- ISO 270001 for data protection and security
- British Safety Council (5 stars) for health, safety and environment

Each project we undertake is assigned a project manager responsible for overall delivery (particularly time and cost control) and communication with clients.

Data Protection

We regard the lawful and sensitive treatment of personal information as critical to the success of our operations, and have implemented formal procedures since 1988. Our Procedures already comply with the information security standard ISO/IEC 27001:2005 and

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reflect recent government publications such as the Data Handling Procedures in Government Report and the Data Sharing Review. They also comply with all the Cross Government Actions: Mandatory Minimum Measures as outlined by the Cabinet Office.

Early identification of risks

Our guidance on identifying, assessing, managing and monitoring risks is based on best practice from the Association for Project Management (APM) Project Risk Analysis and Management (PRAM). It encompasses project delivery, health, safety and protection of the environment.

A detailed risk assessment is undertaken at the start of each project, using input from the client and project team members. Each risk is evaluated in terms of Probability and Impact (high, medium, low), an owner assigned, and a strategy developed to manage it. This is recorded on a Project Risk Register and reviewed with the team and client throughout the life of the project.



Where there are significant risks to the project, formal review points or 'gateways' may be identified in the plan. These require an assessment of risk to be undertaken with an understanding that the project can only continue if certain criteria are met.

A separate risk register is managed outside of contracts relating to key staff, resource availability and succession planning.

Reporting and delivery of progress reports

TRL's Business Management System houses real-time information on e.g. project deliverables, costs and invoicing. This information is available on-line to project managers, who review actual spend, forecast future resource needs, and forecast future spend profiles (at least) monthly, in accordance with procedures. The system also provides sight of every person's future time commitments on projects, enabling peaks of work to be managed effectively across larger programmes of work.

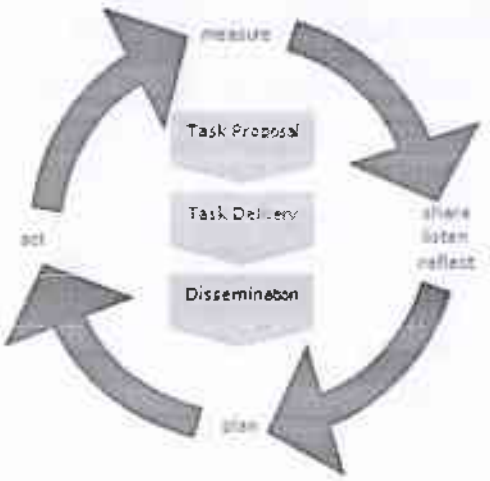
These systems and processes provide:

- the information required by project managers to maintain tight control of project time, costs and delivery
- summary management information to business managers for internal review
- Summary management information for clients.

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Continuous Improvement



TRL operates a loop of learning which allows continuous improvement in project/task delivery. The project loop comprises recognised improvement activities which include:

- Regular Reporting / Review with client
- Project / contract KPIs
- Acting on feedback and lessons learnt

At the end of each task / project we review its performance, noting lessons learnt, and gather customer feedback through electronic questionnaires. Findings are analysed by senior managers and actions developed to improve our performance. These are disseminated to wider team members.

Performance Management

Adherence to the KPIs is pivotal to the success of the contract, in order not only to surpass client expectations, but to cement the relationship which ultimately leads to contract longevity.

We will provide an open and transparent approach to communication and reporting, through all levels between TRL and the client. We provide communication platforms that will allow real- time access to both building performance, as well as services delivery progress.

TRL's core KPIs include:

- Delivering On Time
- Communication
- Regular Reporting
- Timely Invoicing
- Effective Cost Management

These are monitored on every project; however, to ensure we meet our Customer's needs, these KPIs can be adjusted to include specific Customer requirements

TRL currently leads large supply chains for both Highways Agency and Department for Transport. Our success in managing our own and our subcontractors performance is highlighted by our top ranking Key Performance Indicator scores on the Highways Agency National R&D Framework. In the latest review, TRL obtained the following scores (out of 10) for the performance of its consortium.

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Customer Satisfaction Questionnaire

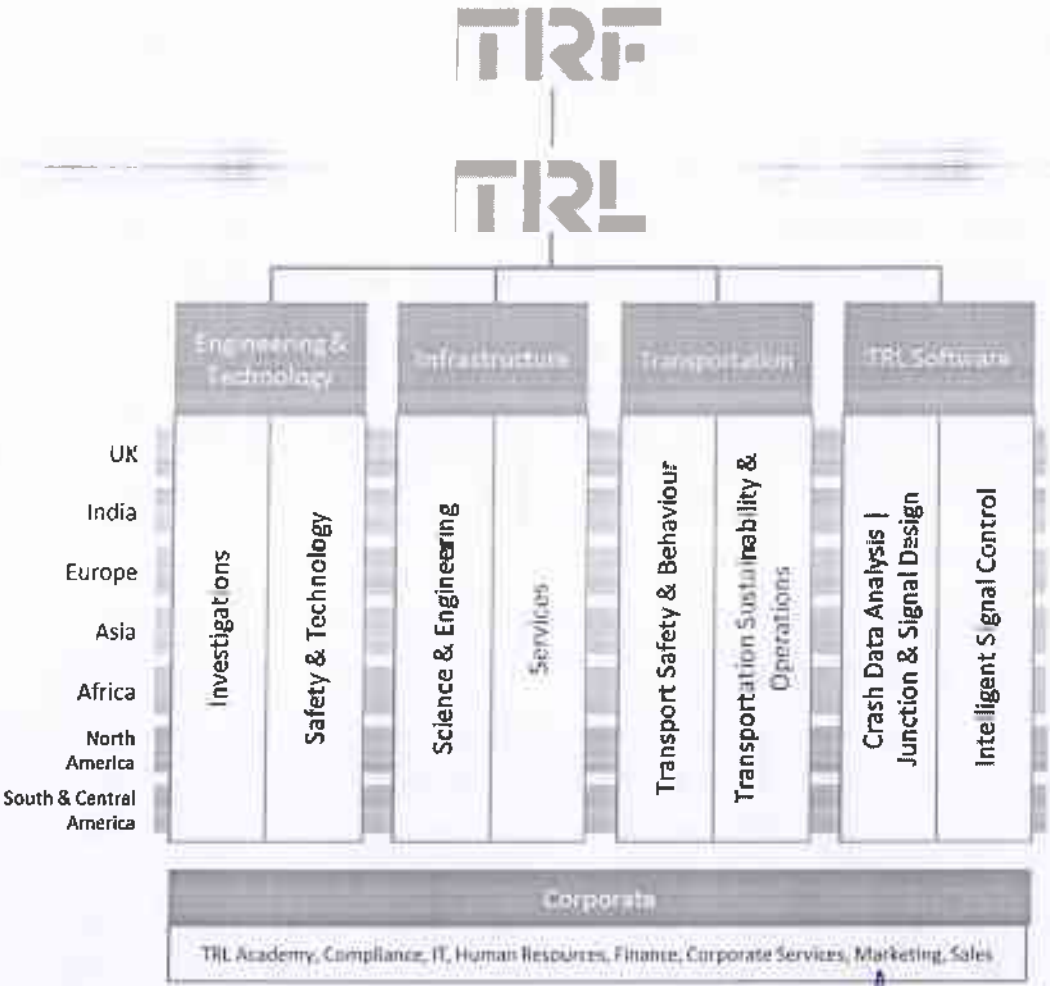
As well as measuring our key performance indicators, TRL also conduct Customer Satisfaction Questionnaires. At the end of each project we review its performance, noting lessons learnt and gather customer feedback through electronic questionnaires. Findings are analysed by senior managers and actions developed to improve our performance.



The information collated is fed into our Business Improvement Programme. These are reviewed by management on a regular basis.

Organisational chart

TRL's Software Division will lead the delivery of this project.



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2.9 Technical Information – Experion Technologies (India)

2.9.1 About Experion

Experion Technologies, an Inc. 5000 company, is one of the fastest growing custom software solutions company that leverages digital technologies such as Mobile, Web, Internet of Things (IoT), Artificial Intelligence (AI) and Analytics to develop results-focused software products and applications for Enterprises as well as early stage companies. Over the past 13 years, Experion has delivered software solutions to over 120 clients across the Retail, Transportation/ Supply Chain, Healthcare & Financial Services domains in 26 countries.

The company delivers technology solutions and services from its **global delivery centers at Technopark, Thiruvananthapuram and Infopark, Kochi**, where it employs over 530 professionals.

Experion's leadership team comprises of seasoned professionals with experience in executive leadership, global business management, sales & marketing, software technologies, delivery management, product management and consulting.

Experion was rated among the fastest growing companies in America by Inc. Magazine as part of their Inc. 5000 ranking for 2018. The company was featured by Deloitte in the elite Technology Fast 50 India rankings list for 2017, as well as the Technology Fast 500™ Asia Pacific rankings list for 2016 and 2017. Experion was also lauded for two continuous years as one among the "Top 100 fastest growing companies" by Red Herring.

Experion has offices/ direct presence in Australia, Germany, India, Netherlands, Switzerland, United Arab Emirates, United Kingdom and United States. The company's customers include globally recognized names such as Bacardi, Aegon, Johnson & Johnson, Merck Group, Aditya Birla Group, NCI, AstraZeneca, Regus, Alexion Pharmaceuticals, Mars, Dr. Oetkar's, Tyson Foods and TopGolf among several others, apart from over 60 early stage companies across the globe. Experion is an ISO 9001 certified company by Bureau Veritas.

Experion offers specialized products and services for enterprises of all sizes, Independent Software Vendors (ISVs) as well as early stage companies:

- Product Solutions
  - FieldMax®
  - xPort®
- Software Services
  - Digital transformation Services
  - Enterprise Solutions & Services
  - Product Engineering Services

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2.9.2 Solutions & Frameworks

Experion offers a suite of mobile based products for use by enterprise customers under the FieldMax® brand. The products, which are available in all major technology platforms, are designed to offer significant business benefits, ease of use and convenience to enterprises of all sizes. The products are also characterized by intuitive usability, secure data access, centralized administration, off-line data capability and advanced reporting features.

The products that are offered under the FieldMax® brand are:

1. FieldMax® FMCG: Sales Order and Distribution Management solution for FMCG Industry
2. FieldMax® Pharma: Mobile based Field Reporting Solution for Pharma Field Sales
3. XTEND: Enterprise Mobile Analytics/ Business Intelligence (BI) framework
4. FieldMax® Survey: Mobile/ tablet based solution to administer custom surveys
5. i-Detailing Framework: Tablet based solution for effective product detailing
6. e-Catalogue Framework: Tablet based solution for digitized product catalogues

FieldMax® FMCG

FieldMax® FMCG is a set of mobile and web based applications used for sales order and distribution management solution for the FMCG/ Consumer Products industry. FieldMax® maximizes field productivity by enabling sales personnel capture order information on a real time basis. The solution can be easily integrated with enterprise applications such as ERP and accounting applications for seamless, bi-directional data updates

The FieldMax® solution has two components - one for the field personnel, called FieldMax® Mobile, second for the back office staff and management called FieldMax® Office.

- FieldMax® Mobile application is used by the field staff to enter field information (field orders, collections, competitor data, etc.) on GPRS/ Wi-Fi/ 3G enabled handsets
- FieldMax® Office is a cloud based web based application that facilitates monitoring, support and management of the field activities

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The FieldMax® FMCG solution offers significant RoI for FMCG/ Distribution companies as sales and services efficiency increases by over 10% as per studies by organizations like Nestle.

FieldMax® Pharma

FieldMax® Pharma is a comprehensive field reporting solution for pharmaceutical field sales. Enabling a collaborative experience between field activities and the head office, the solution allows Medical Representatives to use the FieldMax® Pharma mobile application to capture field information (visit details, expenses, gift details, etc.) on-the-go. The information gets synchronized with the server in real time and the web based FieldMax® Pharma back office module assists the management & operations team to monitor the sales trends, performance, and product movement.

The FieldMax® Pharma solution is a major enabler for assessing the effectiveness of Medical Representatives for pharma company strategists.

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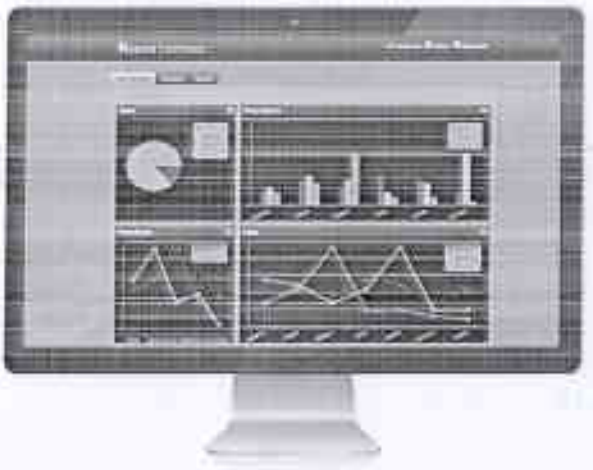


XTEND

XTEND is a mobile based Business Intelligence (BI) framework that transforms data into attractive, easy-to-understand dashboards & reports. The solution helps publish and distribute dashboards and analytics on mobile devices. Management Users and Business Heads can access such BI reports to execute quick decisions.

The data for the dashboards/ reports can be accessed from ERP systems (SAP, Oracle, Microsoft Dynamics, etc.) or any similar enterprise applications. The mobile application is available on platforms such as BlackBerry, Symbian S60 and Windows Phone.





FieldMax® Survey

The FieldMax® Survey Management framework from Experion is a mobile/ tablet based solution to administer custom surveys to a selected target user group. The solution can be

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effectively used to automate surveys, quizzes, customer feedback and questionnaire based promotional campaigns.

The framework comprises of two components:

- A web based backend application that helps an administrative user to set survey questionnaires and publish it to target users
- A mobile application through which survey participants access the survey to provide responses

As the survey participants respond to the surveys/ tests in near real time using the mobile device, this eliminates the need for logging into laptops/ computers. Upon completing the survey, the responses are sent to the back end application, where authorized personnel will be able to analyze the data in detail and view intelligent reports.

By using GPS capabilities, the FieldMax® Survey Management framework can also be used to administer location based surveys for specific purposes.



i-Detailing Framework

The i-Detailing Framework is a mobile/ tablet based solution for effective, in-depth product detailing. Sales organizations can use the framework to convert conventional sales collateral (product brochures, presentations, etc.) into visually rich and interactive mobile applications. The interactivity and effectiveness of the application is boosted with the help of interactive slides containing animations, contextual Q&A and rich multi-media content.

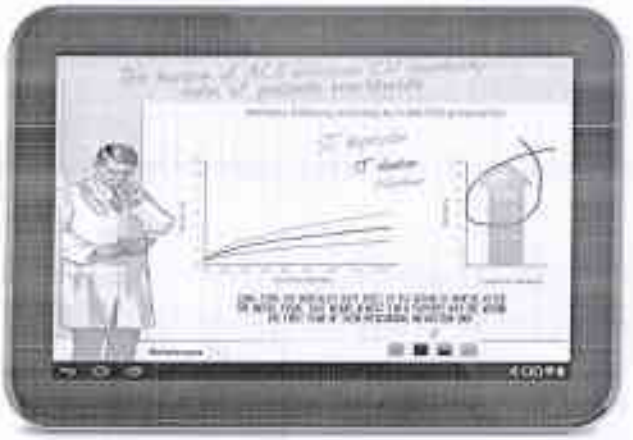
The application can provide powerful integrated analytics to the management staff to track usage characteristics such as slide view analysis and user wise reports. The i-Detailing

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framework provides excellent RoI when it comes to the pace with which organizations can take collaterals to market in the digital domain.



E-Catalogue Framework

The e-Catalogue framework is a mobile/ tablet based solution digitized product catalogues. The solution is tailored for use by enterprise field staff (sales personnel, retailers, etc.), whereby product information in the form of e-Catalogues can be quickly accessed from mobile/ tablet device using a simple and easy to use application. Users will be able to search and browse for product information grouped into categories and sub categories.

Using a web based Catalogue Configuration tool, an administrative user can create and manage e-Catalogues. Catalogues can be grouped into categories and sub-categories and can contain detailed product information with images and videos. The administrative user can also manage user access to the tablet based e-Catalogue application through the Catalogue Configuration tool.





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2.9.3 Software Services

The services offered by Experion are broadly classified into:

1. Digital Transformation Services
2. Enterprise Solutions & Services
3. Product Engineering Services



Experion Service Offerings

These services are provided by specially formed Business Units (BU) organized under a Director of the company. Each BU has a set of Project Managers, Technical Architects, Developers, Business Analysts, etc. and takes up projects dedicated to that BU. Resources for UI/ UX and Quality Assurance are common across the different BUs and works with the project teams based on a set plan.

Experion has worked with a handful of customers as a technology partner from product conceptualization to full product development. With Product Engineering Services as one of our core service offerings, Experion has taken full ownership from a technology and product management standpoint, helping our clients scale their business from a start-up to an established product company. In almost all cases, the relationship has gone beyond initial development where Experion has continued product development/ enhancements and maintenance & production support.

Digital Transformation Services – Designed to digitally transform traditional business processes and IT applications. Experion offers advisory services to assess existing IT infrastructure, business process and to implement technologies that can disrupt conventional solutions.

Offerings under Digital Transformation include services such as:

a. Internet of Things
b. Smart Mobility
c. Artificial Intelligence

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d. Chatbots

e. Robotic Process Automation

f. Cognitive Computing

Enterprise Solutions and Services – Portfolio of services tailored for the enterprise; Involves a specialist team of business analysts and technology consultants experienced in working with enterprise business/ IT teams and solving complex business challenges. Utilizes technologies, tools and processes, that align with enterprise IT landscape, to roll-out future-proof, state-of-the-art solutions for the modern enterprise. IT partnership-based approach to augment enterprise IT teams and to fast track development initiatives.

Offerings under Enterprise Solutions and Services include:

a. Business Intelligence & Analytics

b. Application Development & Maintenance

c. Independent Verification & Validation

d. Technology Modernization

e. Consulting Services

f. DevOps

Product Engineering Services – Experion is a specialist provider in product engineering services and helps clients convert ideas into commercial IT products. We have successfully delivered over 50 products to start-ups/ product companies (independent software vendors) since 2008. End-to-end product lifecycle services offered under Product Engineering Services cover all major web and mobile technology platforms, and are consulting-oriented to augment client's product development plans and strategies.

Offerings under Product Engineering Services include:

a. Requirements Gathering & Scoping

b. Research & Usability Engineering

c. Prototyping

d. Application Development

e. Testing & QA

f. Deployment

g. Training & Sales Support

h. Maintenance & Technical Support

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2.9.4 Technology Competence

Our technical expertise spans (but is not limited to) the following areas:



Experion differentiates itself with its successful track record in delivering innovative solutions, flexible engagement models, mature processes and continuous focus on emerging technologies.

6.3.1. Key Customers



2.9.5 Awards & Recognition

Inc. 5000	• Inc. Magazine featured Experion Technologies in its annual list of Americas' fastest-growing private companies — the Inc. 5000 – for two consecutive years (2019 & 2018). • Experion registered a three-year revenue growth of

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	143% to improve its position by 434 places to get listed in Inc. 5000 at No. 2694 this year. • The listing puts the company in an elite group which has, over the years, included companies such as Microsoft, Timberland, Vizio, Intuit, Chobani, Oracle, and Zappos.com.
500 Technology Fast 500 2017 APAC Winner Deloitte	• Deloitte Touche Tohmatsu Limited ranked Experion in the Technology Fast 500™ Asia Pacific rankings for two consecutive years - 2016 and 2017. • The Deloitte Asia Pacific Technology Fast 500 is an annual ranking of the fastest growing companies in the Asia Pacific region across a wide range of technology domains.
50 Technology Fast 50 2017 India Winners Deloitte	• Experion was featured by Deloitte Touche Tohmatsu India LLP in the elite Technology Fast 50 India rankings list for 2017. • The Deloitte Tech Fast50 India Program ranks the fastest growing technology companies in India based on their percentage revenue growth over the last three financial years.
Clutch The Clutch 1000 Global 2018 Clutch Clutch	• Experion has been listed among the Top Web Applications Development companies, Top Software Development Firms and Top B2B Service Providers by Clutch for 2018 and 2019. Earlier, Experion was also ranked by Clutch as one among the Top Retail Mobile App Development Companies across the world. • Based out of Washington, D.C., Clutch is a global B2B ratings and reviews platform that identifies outstanding technology firms to help businesses make smarter buying decisions.
APAC CIO Outlook Top 25 RETAIL SOLUTION PROVIDERS - 2018	• APAC CIO Outlook magazine listed Experion among the top 25 global retail IT solution providers in the region for 2018. • APAC CIO Outlook is one of most well-respected technology media organizations in the APAC region.
2016 IoT Product of The Year	• Experion's mobile-based sales order management solution, FieldMax® received the "2016 IoT Evolution Product of the Year Award" from IoT Evolution magazine and IoT Evolution World. • The IoT Evolution Product of the Year Award honors the best in IoT technology, across a range of verticals and

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	disciplines, from the Smart Home to the Industrial and Enterprise IoT Sectors.
NASSCOM® FROST & SULLIVAN	• FieldMax®, Experion's sales force automation solution was featured in the Mobility Quadrant of NASSCOM's Product Excellence Matrix for 2013. • NASSCOM, in partnership with Frost & Sullivan, benchmarks Indian software products through the Product Excellence Matrix.
RED HERRING 100 ASIA FINALIST	• Experion was shortlisted as a Red Herring 100 Asia finalist for 2013 and 2014, from among hundreds of companies across Asia. • The shortlist was based on the value addition brought about by Experion's sales force automation solution, FieldMax®, to enterprises using innovative use of mobility technologies.

2.9.6 Office Locations



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2.10 TRL & Experion Partnership

TRL has a strategic partnership with Experion Technologies (India) Private Limited to provide software development, maintenance & implementation support for its suite of IT products. In addition to supporting TRL's software development and maintenance initiatives, Experion supports our implementation of road management solutions throughout the Middle East, Africa and India.

Experion is TRL's proven, long-term, strategic partner in the development and delivery of TRL's transport management system solutions worldwide.

Through this partnership, since **2011**, TRL supported by Experion has successfully delivered road asset management and road safety management solutions for the following countries -

- iROADS[2] SaaS provision for Isle of Wight – 2019
- iROADS SaaS provision for Isle of Man – 2019
- iROADS SaaS provision for TfL, UK – 2019
- iROADS SaaS provision for Nigeria – 2019
- iROADS PFI Module Development, 2019
- Ghana iMAAP Cloud Crash Data Analysis System – Phase II, 2019
- Mauritius iMAAP Road Accident Data Management System, 2018
- Kenya iMAAP Road Accident Database Management System, 2018
- Himachal Pradesh iMAAP Road Accident Data Management System, 2014
- Himachal Pradesh iMAAP Annual Maintenance Support, 2016-2019
- Qatar National Crash Data System, 2015
- Kuwait National Road Safety Management System, 2015
- Dubai Integrated Accident Management System, 2012
- Abu Dhabi National Crash Analysis System, 011
- Oman National Road Accident Data Management System, 2012
- Ghana iMAAP Cloud Crash Data Analysis System, 2012
- UK Gov G-Cloud iMAAP Integrated Crash Analysis System, 2018
- Several UK Counties, 2011- 2019

The following systems implementation projects are expected to commence in 2020:

- Road Accident Database Management System, Botswana
- iROADS Deployment, Uganda

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Key Benefits for the Kerala PWD when selecting TRL-Experion Team

Key Strengths	Benefits to Client
TRL's development and maintenance support for all global clients is delivered from Trivandrum Technopark involving Experion project teams	Easy, local and quick access for any troubleshoot/ update of implemented RMMS Kerala PWD's E-Governance cell will have easy and quick access for any customised training requirement either in the PWD offices or in any of the offices of Experion in Trivandrum or Kochi
TRL' deep expertise in the road maintenance/ asset management domain including pavement data collection, maintenance needs analysis and asset management strategies	Kerala PWD can always call in TRL's expertise to receive support/ advice on all issues associated with road maintenance and road asset management related activities
TRL is at the heart of all emerging trends technologies in road asset management in the UK	Kerala PWD can rely on evidence based advice from TRL on emerging technologies in road asset management
TRL's involvement with HDM-4; TRL was a co-developer of HDM-4 along with the University of Birmingham and plan are in anvil to further improve HDM-4 with the support of TRL	TRL is going to be at the centre of future development of HDM-4 and there is a major update of HDM-4 planned by HDM developers. HDM will be key for Kerala RMMS to sustain, Kerala PWD can benefit from any future changes in HDM by TRL passing on the inner knowledge on the changes made through training in the annual maintenance period
TRL's core business/ expertise is on road asset management, road safety, urban transport solutions and climate resilient transport infrastructure solutions	By having TRL engaged with GoK for 8 years, GoK can access TRL's wider expertise to help solve problems related to all of these three areas and to keep GoK updated on evidence based and data led interventions on road maintenance management, road safety urban transport and climate resilient solutions
Research programmes undertaken by TRL Academy in asset management, road safety	In an 8-year engagement, the wider GoK and Kerala PWD can develop exchange

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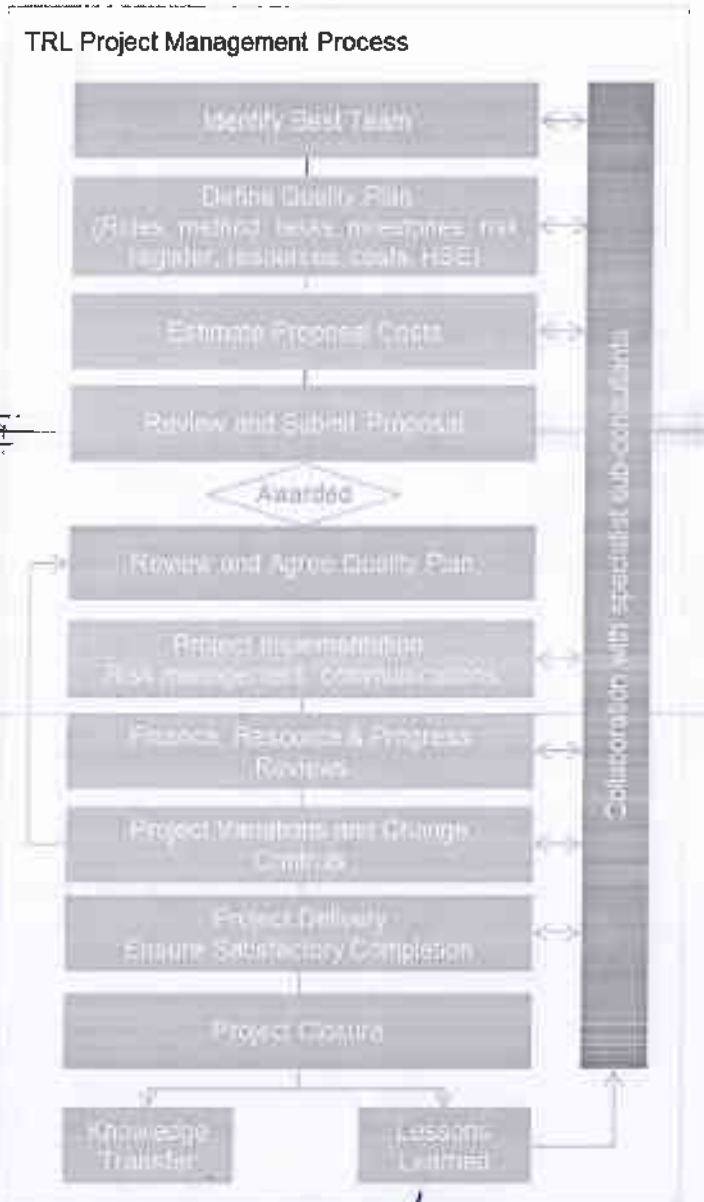
Key Strengths	Benefits to Client
and climate resilient models	programmes which will help Kerala PWD to get exposure training to latest developments in road asset management, road transport solutions and climate resilient solutions for sustainable transport infrastructure.

2.11 Our Project Management and Quality Assurance Processes

All TRL and supply chain work shall comply with the requirements of TRL's Integrated Management System (IMS) which is independently certified by UKAS-accredited NQA to international quality standards:

- ISO 9001:2008 (Quality Management Systems),
- ISO 14001 (Environmental Management Systems),
- OHSAS 18001 (Occupational Health and Safety Management systems),
- ISO 27001 (Information Security), and
- ISO/IEC 17025:2005 (Competence of testing and calibration laboratories).

The IMS covers all aspects of TRL work including design, development, production, installation and services. Our compliance team conducts regular internal audits our IMS, in addition to NQA audits.



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We recognise the increasing importance of expert advice, research and innovation to support the client's objectives, alongside effective governance procedures, and we share an ambition to optimise outcomes in support of your vision.

For projects of similar scope, we name a project leadership team with the management and technical experience and qualifications required to deliver the project scope proposed.

Project Manager is responsible for delivering the project to time, to budget and to the expected level of quality. He will be responsible for:

- Project delivery strategy and risks
- Clarifying and understanding client needs
- Resource allocation and management
- Driving and monitoring quality of service
- Target setting to drive and assure overall quality of service, best practice, innovation and continuous improvement; monitor performance against objectives
- Developing and communicating the project plans to ensure knowledge is shared with the wider delivery team to ensure they are fully aware of the latest developments, requests and needs from the client organisation
- Maintaining, developing and communicating Framework documentation (including the Quality Plan) which will be stored in TRL's SharePoint system.
- Financial coordination and supervision of Banking, Financial, Liability and Insurance procedures
- Resolution of any disputes.

Technical Lead will each be responsible for ensuring the technical quality of TRL's methodologies and product development, respectively. This includes ensuring that the most appropriately qualified experts are appointed to the delivery teams.

Subject Matter Experts are respected specialists with experience in coordinating programmes of work. They will support the Technical and Product Development Leads as needed by advising on issues specific to their specialist area(s) and acting as Technical Reviewers across related projects in their specialist area(s).

Our approach to ensuring the requirements of the specification are met in terms of quality is aligned with our formal Project Management Procedures and fully embedded within our Integrated Management System.

A key focus of our approach is the early identification, allocation and personal involvement of our named resources at the proposal stage, calling on knowledge gained in previous projects.

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This has enabled us to define a pragmatic and sustainable programme as we seek to:

- Minimise cost overruns;
- Ensure value for money, reflecting market value;
- Ensure that there is sufficient funding to sustain quality and complete the project;
- Enable risks to be successfully managed; and
- Enable unexpected issues and change requirements to be addressed effectively.

For project implementation and management, TRL utilises the Deltek Maconomy Project Enterprise Resource Planning (ERP) software for time recording and project management. Our aim is to ensure that, throughout the project lifecycle:

- Our work remains fully aligned with the client's expectations, including resource, timescales, method of approach, communications, outputs and outcomes; and
- Scheduled Quality Assurance / Technical Reviews, reviews of risks, billing, and regular review meetings with the client and project teams are maintained.
- Our IMS requires the production, maintenance and implementation of the following Project Plans, which will be produced by the Project Manager, ensuring team engagement from project inception to completion:
    - Project Management Plan, shared with the project team.
    - Communication Plan, outlining clear lines of communication with TfL and all resources, includes a Stakeholder Engagement Plan.

Risk management

Our procedures on risk and opportunity management are based on best practice advocated by the UK Association for Project Management. A detailed risk assessment is undertaken at the bid stage of each project, and then fully reviewed at programme inception using input from the client and project team members. Each risk/opportunity is evaluated in terms of its probability of occurring and the impact it would have on the successful delivery of the programme. An owner is assigned to each one, and a management strategy developed. This is recorded on a Project Risk Register and reviewed with the team and client at project review meetings, throughout the life of the project. Our internal IMS Risk Management processes align with the principles in ISO 31000:2009 and BS 31100:2011.

Quality Checks and Controls

Specific quality control activities for each project phase are defined and integrated into the project and programme plans, and typically include management and peer reviews, use of quality assurance tools and product testing, as described in detail in Section 2. Our IMS

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incorporates a Technical Review system aimed at ensuring technical excellence through a focus on quality and problem solving. An experienced Subject Matter Expert, one step removed from the delivery team, the Technical Reviewer provides a peer review assessment to ensure project work and deliverables are thoroughly reviewed and meet the client's expectations, and that high quality is promoted.

Management Information and Reporting

Our Business Management systems house real-time information on e.g. project deliverables, costs and invoicing. This information is available on-line to all project managers and is reviewed at least monthly. These systems and procedures provide information required by project managers to maintain control of project time, costs and delivery of outputs and deliver efficient project programming.

Availability of resource

Our management system provides sight of every person's future time commitments on projects, enabling peaks of work to be managed effectively across larger programmes of work and to ensure that the correct people are assigned to each project. To maintain expertise, we have an excellent programme of succession and personal development planning in place for all staff to ensure that key skills are transferred or developed.

Lessons learned

For all projects, we create a register of Lessons Learned. We will review the outcomes of previous projects to identify lessons that can be applied to the specific project. This will include the results of project audits and project reviews. We will also review any lessons from corporate management, programme management and external contacts, and consult with individuals or teams with previous experience of similar projects. We utilise lessons learned to ensure that forecast costs are realistic and align with those incurred.

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2.12 Project Delivery Team

TRL brings the best possible team from across the world with direct, relevant experience to the project. TRL feels that this is a unique and challenging project compared to other consulting services and asset management projects due to the innovative "long term" approach required by the Client for sustainability of the system. This because at the end of the project, the Client is expecting a robust, high-quality, integrated Road Asset Management system which is sustainable and will function across Kerala PWD. Implementing such an integrated and sustainable system is a specialized and challenging task. This demands a team with proven "successful" experience, knowledge and skills to meet the objectives of KSTP/ Kerala PWD - unlike normal engineering consulting services which end with producing reports and non-sustainable solutions.

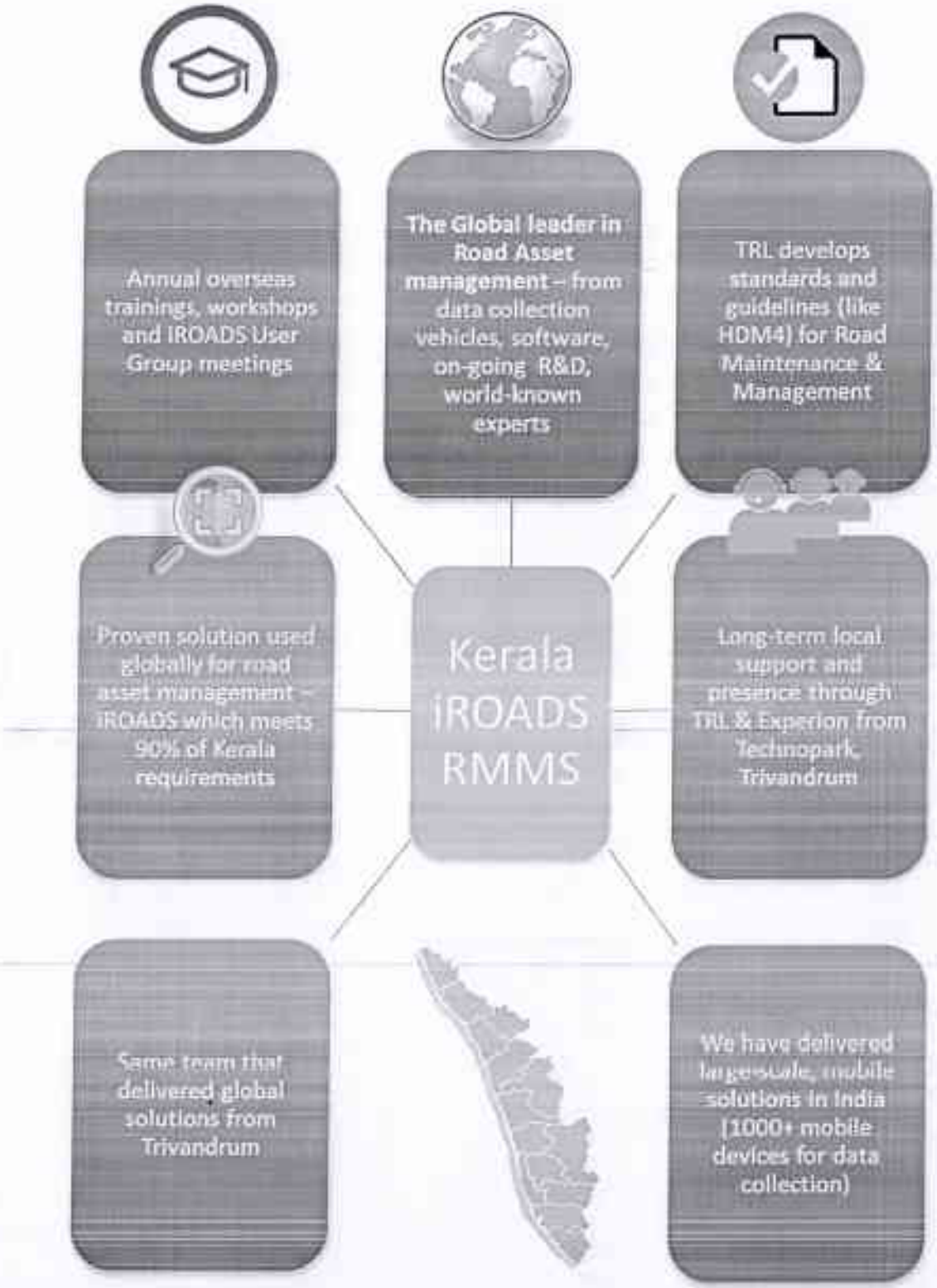
TRL has assembled an experienced team of experts to deliver all technical aspects of the project and exceed client expectations. The project will be led by an experienced Team Leader who has delivered similar projects in India and the region and speaks Malayalam and English. The Team Leader will be supported by a Deputy Team Leader who has extensive experience in India and internationally is fully familiar with working environment of Kerala PWD. The structure of the TRL team for this project is depicted below. All the key members of the team are especially adept at Capacity Building and Training. For example, Tony Mathew, Team Leader is a gifted and accredited trainer and is well known for his capacity building and training skills for programs he has delivered for MoRTH and several State Government road authorities.

The consultant's project delivery team includes globally renowned domain experts in pavement and road maintenance management from TRL (based in the UK) combined together with software engineers in TRL and Experion Technologies based in Trivandrum and Kochi.

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TRL Delivers Global best practices in Asset Management and will provide long-term, local support to Kerala PWD from our permanent office in Trivandrum

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The team drawn up for delivering this project is shown in the Figure below.

Figure 2-1 Project Organisation Chart



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The list of Key staff, non-key staff and technical specialist panel selected to deliver the Kerala RMMS project is shown in the Table below.

Table 2-3 List of Key Staff, Non-Key Staff & Technical Specialist Panel

Key Experts			
CV No.	Name	Role	Location
KEY STAFF			
K-1	Tony Mathew	Team Leader	Trivandrum, Kerala
K-2	Abhilash Kishore	Software Delivery Manager	Trivandrum, Kerala
K-3	Raman Kumar	iROADS Product Specialist	Trivandrum, Kerala
K-4	Pradeep Raj	Solution Architect	Trivandrum, Kerala
K-5	Francis Sajay	Senior Software Developer	Trivandrum, Kerala
K-6	Manu Murukan	Mobile Application Developer	Trivandrum, Kerala
NON-KEY STAFF			
N-1	Jaimy Thomas	Project Director	Trivandrum, Kerala
N-2	Ashish Thankappan	Quality Analyst	Trivandrum, Kerala
N-3	Jinson Joseph	UX-Designer	Trivandrum, Kerala
N-4	Subu Kamal	Product Platform Architect	London, UK
ROAD MAINTENANCE MANAGEMENT SPECIALIST PANEL			
P-2	Richard Abell	Asset Management Technical Advisor	London, UK
P-3	Dr. Alex Wright	Chief Scientist	London, UK
P-5	Dr. Greg Morosuik	HDM-4 Specialist & Global Trainer	London, UK
P-10	Sanjay Vadgama	Principal Data Analyst	London, UK
Total National Key-Experts			
% of total		100%	

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Personnel Capabilities

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Key Staff	
1.	Team Leader
	Tony Mathew – B Tech Civil Engineering (University of Calicut), MSc Road Management and Engineering (University of Birmingham)
Non-Key Staff & Technical Support Team	
1.	Product Platform Architect
	Subu Kamal – BE Computer Science & Engineering (Amravati University)
2.	Asset/ Maintenance Management Technical Advisor
	Richard Abell – BSc (Hons) Physics (University of Birmingham, 1970), MSc, Statistics and Operational Research, (City University, 1983)
3.	Chief Scientist
	Dr. Alex Wright – PhD Physical Chemistry (1996) & CPhys Chartered Physicist (2011)
4.	HDM-4 Specialist & Global Trainer
	Dr. Greg Morosuik – PhD Civil Engineering (1983)
5.	Principal Data Analyst
	Sanjay Vadgama – B Eng Electronics Systems Engineering (1989), PRINCE2 Foundation & Practitioner (2016)

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Tony Mathew



Tony has hand-on experience in all aspects of highway projects including design, construction, road safety, road asset management systems and institutional development in the road sector, both in India and other developing and developed countries. This places him with a unique advantage to lead a project of this nature. Tony is a permanent employee of the lead firm. Tony has a total of 20 years of professional experience, including more than 10 years' experience in GIS based road management systems in geospatial environment.

- 2016-19 – Is various TRL projects involving Road Safety and Asset Management Systems as Project Director, leading the TRL operations; *Tony is also the product owner of iROADS (Road Asset/ Maintenance Management System and iMAAP (Road Safety Management System) -- two major data management systems of TRL;*
- 2010-16 – In GIS based RAMS & RADMS projects in Tanzania, Vietnam and in India (Odisha & Himachal);
- 2006-10 – Involved in developing and implementing GIS based road asset management systems in various local highway authorities in England;
- 1999-2005 – Projects in Kerala and Gujarat in India; Involved in data collection surveys using geospatial technology, development of GIS based road accident and other management systems;

Tony has worked as Dy. Leader in projects where asset management systems design were involved in UK, Tanzania, and India.

- 2016-19, Project Director – Himachal Pradesh RADMS (iMAAP)
- 2014-15, Deputy Team Leader – Road Asset Management System Project in Tanzania
- 2012-14, Deputy Team Leader – Odisha Road Sector Institutional Development, Odisha
- 2009-10, Team Leader, Norfolk Transport Asset Management Plan, England
- 2008-09, Deputy Team Leader, Norfolk Highway Asset Management Framework
- 2007-08, Deputy Team Leader – Development of Transport Asset Management Plan, Sheffield City Council, England

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Subu Kamal



Subu is Strategic Applications Director of TRL – responsible for development of large-scale products and leads the complete lifecycle – from requirement analysis, System Architecture, UI / UX and the full Software Development Lifecycle.

Before TRL, Subu was "Business Systems Manager" at IBS Software Services, a CMMI Level 5 global IT firm with 2000+ employees and marquee customers across the globe. Subu was responsible as Business Analysis and Product Management. He was also instrumental in starting the Surface Transportation Line of Business in IBS.

Richard Abell



As Practice lead (Asset Management) Richard leads the TRL research in this area, ensuring the quality of the work meets the standards expected from TRL. He is a Research Fellow of the Transport Research Foundation. Richard's principal expertise is in whole life costing and maintenance management. He has developed prototype whole life cost models for the assessment of new construction work and the model that forms the basis of the scheme analysis system in the UK Highways Agency Pavement Management System. The new construction model, COMPARE, has been used to examine the benefits of pavement construction options on various roads across the network. He has been responsible for the development of whole life models for network level analyses and has advised on the use of these models for the analysis of the maintenance budget requirements for the Highways Agency. Option assessment has included Cost-Benefit analyses over the expected life of the road. Richard has played a key role in the development of cost-benefit assessment tools for non-pavement assets (e.g. structures, and drainage). Richard has undertaken an analysis of the wider economic, environmental and social impacts of road maintenance funding in England and Scotland.

Alex Wright



Alex is an experienced project manager, who has managed a wide range of projects, particularly in the area of pavement surface assessment, ranging from system development through to system testing, acceptance, quality assurance, provision of advice and the development of requirement specifications. Currently responsible for the quality audits of the network level pavement condition (TRACS) surveys carried out on the Highways Agency road network, the Scottish SRMCS and the English Principal Road Network. Alex's technical skills range from the development and testing of hardware and software for both the high speed collection and analysis of condition data - including inertially aided Global Positioning Systems (GPS), image processing and the analysis of transverse, longitudinal and texture profile - through to the application of the condition data for network level assessment.

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Greg Morosuik



Over 36 years' experience at the TRL working on a variety of problems in developing countries concerned with road performance and deterioration, the interaction between road condition and vehicle operating costs, whole life costing, road rehabilitation and road investment generally. Experience has been gained throughout the world, from the Caribbean, throughout Africa to the Far East. Since 1987 Dr Morosuik has spent the majority of his time on institutional development projects. Four years were spent in Malaysia where he was responsible for establishing a Research Institute within the Public Works Department. He has carried out similar duties at the Institute of Road Engineering in Indonesia, the Department of Roads in Zimbabwe and the Department of Public Works and Highways in the Philippines. Since the mid 1990's he has been involved in the development and management of the road investment model HDM-4 and is responsible for all HDM-4 initiatives at TRL. Responsibilities include: i) development of road deterioration relationships for HDM-4 versions 1 and 2 ii) authoring and contributing to HDM-4 publications for versions 1 and 2 iii) co-ordinating, running and lecturing at HDM-4 training courses and workshops.

Sanjay Vadgama



Sanjay has over 18 years of experience developing and managing road safety related software at TRL and has also gained road safety engineering and audit experience. He has experience of overseeing and project managing various road safety crash database projects both in the UK and internationally which includes countries within the Middle East, Africa and Asia. These projects involve multi stakeholder engagement and are delivered in accordance with international best practice. Sanjay also project manages the iMAAP product and it derivatives at TRL, which are used in many of the crash database projects. In addition he has experience of requirements capture, design and configuring databases for local conditions and languages, also deploying and training personnel in its use. He has wide experience of various computer languages and databases and various areas covering the whole software project life-cycle including software project management. He has also been involved with various other projects including incident management databases, web-based databases and GIS related software and advice. Before joining TRL Sanjay has had several years of experience working in software within the aircraft industry and telecommunications sector.

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Key Staff	
1.	Software Delivery Manager
	Abhilash Kishore – B Tech Information Technology (2001), Post Graduate Diploma in Management
2.	iROADS Product Specialist
	Raman Kumar – B Tech in Electrical and Electronics (2008)
3.	Solution Architect
	Pradeep Raj - B.Sc. Computer Science (2003), Master of Computer Applications (2006)
4.	Senior Software Developer
	Francis Sajay - B.Sc. Mathematics (2005), Master of Computer Applications (2009)
5.	Mobile Application Developer
	Manu Murukan – Mobile Application Developer (2010)
Non-Key Staff	
1.	Project Director
	Jaimy Thomas - B Tech Applied Electronics & Instrumentation (1991)
2.	Quality Analyst
	Ashish Thankappan – BSc Electronics (2004), PGDBA (2007)
3.	UX Designer
	Jinson Joseph - B Sc Physics (1998)

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Position Software Delivery Manager		Candidate ✓ Prime
Candidate Information	Name of Candidate Abhilash N Kishore	Date of Birth 17-Apr-1980



Professional Qualifications:

- Certified Scrum Master (CSM) from Scrum Alliance (ID# 000929624 from 2019)
- Project Management Professional (PMP) from PMI (ID# 492293 from 2007)
- Post Graduate Diploma in Management (Marketing) from Symbiosis Institute of Management (2007)
- B-Tech (Information Technology) from Cochin University of Science and Technology (2001)

Present Employment	Name of Employer: Experion Technologies India Private Limited	
	Address of Employer: 407,Thejaswini,Technopark Campus, Thiruvananthapuram- 695 581	
	Telephone - 91 471 3047317, 3047312	Contact
	Fax	Telex
	Job title of candidate Delivery Head	Years with present employer 8 years

From	To	Company (Project/ Position/ Relevant technical and managerial experience
Aug 2011	Ongoing	TRL Limited, UK – Software Delivery Manager. Delivery responsibility from management perspective for software product development of various products. The responsibilities include: • End to end responsibility for iterative delivery of software products, their implementations and support to end customers • Actively participate with TRL Subject Matter Experts to develop the product strategy and roadmap for the products • Key skills include Business Analysis, Project Management, Product Management, Quality Assurance, Team & People Management, Operational & Strategic Planning, Product Implementation management, Support and Maintenance

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		of the software products
July 2018	Jan 2019	TRL Limited, UK – Delivery Manager for the iROADS PFI module. PFI module allows the customers to calculate the road condition indices from the condition data collected as part of various surveys, and produce reports based on the calculated condition indices. The specific activities include, • Implementation management of the project • Analysis & Development of interfaces between different Systems • Coordination of technical research and development works for the project • Preparation of various technical as well as non-technical documents on the project • End to end responsibility for the delivery and implementation of the software product
May 2017	Ongoing	TRL Limited UK – Provide technical support for TfL UK, Isle of Wight (IOW), Nigeria and Sheffield customer on iROADS product. The responsibilities include, • End to end responsibility for the delivery and implementation of the software product
May 2017	June 2018	TRL Limited, UK – Delivery Management for the iROADS re-engineering project. The objective of the project is to discuss with iROADS Subject Matter Experts, and understand the functional details of the features within the iROADS product. The specific activities included but were not limited to: • Design and development of the various feature enhancements • Analysis & Development of interfaces between different Systems • Coordination of technical research and development works for the project • End to end responsibility for the delivery and implementation of the software product
Apr 2018	Till date	Traffic Management and Road Safety Unit (TMRSU), Mauritius – Delivery manager for the Road Accident Database system. The responsibilities include: • End to end responsibility for the delivery and implementation of the software product • Requirement Gathering Process and User Requirement Specification Preparation • As-Is Business Process Study and To-Be Business Process Preparation

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		• Gap Analysis
Aug 2015	Aug 2018	Ashghal, Qatar – Delivery Manager for the road accident database management system. The responsibilities include, • End to end responsibility for the delivery and implementation of the software product • Process Study of existing business • Analysis & Development of interfaces between different Systems • Design and development of various analysis modules
Aug 2015	Mar 2017	United Nations Development Programme, Kuwait – Delivery Manager for Road Safety Management System for Kuwait project. The responsibilities include but are not limited to: • End to end responsibility for the delivery and implementation of the software product • Process Study of existing business • Analysis & Development of interfaces between different Systems • Design and development of various analysis modules
Aug 2014	Jul 2015	Himachal Pradesh State Roads Project (HPSRP), India – Delivery manager for the Consulting Services: Provide, customize & implement a Road Crash Data Management System (RADMS) project. Specific activities include but are not limited to: • End to end responsibility for the delivery and implementation of the software product • Requirement Gathering Process and User Requirement Specification Preparation • As-Is Business Process Study and To-Be Business Process Preparation • Gap Analysis • Involved in meetings with different stakeholders to understand their current business process • Participated in requirement specifications preparation for the enhancements in the system • Design and development of the various feature enhancements
Jun 2012	Apr 2013	TRC, Oman – Delivery Manager for the Project - Road Accident Database System. Specific activities include but are not limited to: • End to end responsibility for the delivery and implementation of the software product • Business Analysis of the existing system

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		• User Requirement Specification Preparation, Gap Analysis, Solution Architecture Preparation • Analysis & Design of interfaces between different systems like Emergency Medical Service, Health System
Jul 2012	Jan 2013	National Road Safety Commission, Ghana – Delivery Manager for the Development of Road Accident Data Management System for Ghana project. Specific activities included but were not limited to: • End to end responsibility for the delivery and implementation of the software product • Business Analysis of the existing system • User Requirement Specification Preparation, Gap Analysis, Solution Architecture Preparation • Participated in requirement specifications preparation for various analysis modules • Analysis & Design of interfaces between different systems like Driver Licensing System (DVLA).
Sep 2011	Dec 2012	DoT, Abu Dhabi – Delivery Manager for the Provision of a Crash Data Analysis and Reporting System project. Specific activities included but were not limited to: • End to end responsibility for the delivery and implementation of the software product • Requirement Gathering Process and User Requirement Specification Preparation • As-Is Business Process Study and To-Be Business Process Preparation • Gap Analysis, Involved in meetings with different stakeholders to understand their current business process
		• Arranged meetings with different stakeholders to finalize the interfacing process • Analysis & Development of Interfaces between different Analysis • Participated in requirement specifications preparation for various analysis modules

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Position IROADS Product Specialist		Candidate ✓ Prime
Candidate Information	Name of Candidate Raman Kumar P	Date of Birth 28-Nov-1986
	Professional Qualifications: Bachelor of Technology (Electrical and Electronics Engineering)	
Present Employment	Name of Employer: Experion Technologies India Private Limited	
	Address of Employer: 407,Thejaswini,Technopark Campus, Thiruvananthapuram- 695 581	
	Telephone - 91 471 3047317, 3047312	Contact —
	Fax	Telex
	Job title of candidate	Years with present employer – 8 years

From	To	Company (Project/ Position/ Relevant technical and managerial experience
Aug 2019	Ongoing	TRL Limited, UK – Provide configuration and technical support for Isle of Man customer for iROADS product. The responsibilities include, • Analyse the network data, condition data shared by the client and upload the data into the system. • Setup different analysis rules and parameters for executing the analyses within the iROADS system. • Analyse the issues and help the technical team with the solutions • Keeping the client informed about the progress of the support request • Preparation of Quarterly Support and maintenance Reports
July 2018	Jan 2019	TRL Limited, UK – Business Analyst for the iROADS PFI module. PFI module allows the customers to calculate the road condition

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		indices from the condition data collected as part of various surveys, and produce reports based on the calculated condition indices. The specific activities include, • Arrange and participate in the meetings with TRL Expert team • Prepare Requirement Understanding Documents for the various within the system • Prepare workflow diagrams • Share the Requirement Understanding Documents for review and incorporate the review comments • Prepare system requirement specifications for the various features in the system.
May 2017	Ongoing	TRL Limited UK – Provide technical support for TfL UK, Isle of Wight (IOW), Nigeria and Sheffield customer on iROADS product. The responsibilities include, • Analyse the issues and help the technical team with the solutions • Keeping the client informed about the progress of the support request • Preparation of Quarterly Support and maintenance Reports
May 2017	June 2018	TRL Limited, UK – Business Analyst for the iROADS re-engineering project. The objective of the project is to discuss with iROADS Subject Matter Experts, and understand the functional details of the features within the iROADS product. The specific activities included but were not limited to: • Arrange and participate in the meetings with TRL Expert team • Prepare Requirement Understanding Documents for the features discussed • Prepare workflow diagrams • Share the Requirement Understanding Documents for review and incorporate the review comments • Prepare system requirement specifications for the various features in the system.
Jan 2018	Mar 2018	Geoscintex, Kenya – Implementation lead for the road accident database management system for a specific region within Kenya. Specific activities include but are not limited to: • Existing data analysis • User Requirement Specification Preparation • QA Testing • Preparation of training materials • iMAAP Training to the different stakeholders
Apr 2018	Till date	Traffic Management and Road Safety Unit (TMRSU), Mauritius – Product Specialist for the Road Accident Database system. The

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		responsibilities include, • Process Study of existing business from offshore • User Requirement Specification Preparation • Gap Analysis Study • Development of Data Migration process from the existing system • QA Testing
Aug 2015	Aug 2018	Ashghal, Qatar – Implementation Lead for the road accident database management system. The responsibilities include, • Process Study of existing business • User Requirement Specification Preparation, Gap Analysis • Analysis and integration of in-house GIS services available in Ashghal with iMAAP • Arranged meetings with different stakeholders to finalize the interfacing process • Analysis & Development of interfaces between different systems • Development of Data Migration process from the existing system • QA Testing • iMAAP Training to the different stakeholders
Aug 2015	Mar 2017	United Nations Development Programme, Kuwait – Implementation Manager for Road Safety Management System for Kuwait project. The responsibilities include but are not limited to: • Business Analysis of the existing system • User Requirement Specification Preparation, Gap Analysis • Arranged meetings with different stakeholders to finalize the interfacing process • QA Testing • Managing customer expectations • Site acceptance testing with customer • Preparation of various technical as well as non-technical documents on the project
Aug 2014	Jul 2015	Himachal Pradesh State Roads Project (HPSRP), India – Business Analyst and QA Lead for the Consulting Services: Provide, customize & implement a Road Crash Data Management System (RADMS) project. Specific activities include but are not limited to: • Involved in requirement specifications preparation for various analysis modules • Reviewed URS documents • Prepared test plans and prepared QC Test Cases for all

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		assigned project releases • Prepared Acceptance Test Cases • Ensured that all the test cases are updated and uploaded in the SVN • Ensure that all the test cases were executed and the test reports were uploaded in SVN • Ensure that all the QC processes were followed by the team members
Jun 2012	Apr 2013	TRC, Oman - Onsite Implementation Lead for the Project - Road Accident Database System. Specific activities include but are not limited to: • Business Analysis of the existing system • As-Is Business Process Study and To-Be Business Process Preparation • Gap Analysis. • Involved in meetings with different stakeholders to understand their current business process • Requirement Gathering Process and User Requirement Specification Preparation • Prepared Acceptance Test Cases • Solution Architecture Preparation • Arranged meetings with different stakeholders to finalize the interfacing process • Analysis & Development of interfaces between different systems • Development of Data Migration process from the existing system • QA Testing • iMAAP Training to the different stakeholders
Jul 2012	Jan 2013	National Road Safety Commission, Ghana – Business Analyst and QC Lead for the Development of Road Accident Data Management System for Ghana project. Specific activities included but were not limited to: • Participated in requirement specifications preparation for various analysis modules • Reviewed URS documents • Prepared test plans and QC Test Cases for all project releases • Prepared Acceptance Test Cases • Ensured that all the test cases are updated and uploaded in the SVN • Reviewed the UTC prepared by the development team • Ensure that all the test cases were executed and the test reports were uploaded in SVN

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		• Ensure that all the QC processes were followed by the team members
Sep 2011	Dec 2012	DoT, Abu Dhabi – QA Lead for the Provision of a Crash Data Analysis and Reporting System project. Specific activities included but were not limited to: • Requirement Gathering Process and User Requirement Specification Preparation • As-Is Business Process Study and To-Be Business Process Preparation • Gap Analysis • Involved in meetings with different stakeholders to understand their current business process • Arranged meetings with different stakeholders to finalize the interfacing process • Analysis & Development of interfaces between different Analysis • Participated in requirement specifications preparation for various analysis modules • Design and development of various analysis modules • Data analysis and preparation of data analysis report • Design and development of Data Migration process to migrate the data from the existing system
		• Deployment of the application and preparation of deployment manual • Conducted User Acceptance Testing • Customer Training

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Position Solution Architect		Candidate ✓ Prime
Candidate Information	Name of Candidate Pradeep Raj	Date of Birth 04-May-1983



Professional Qualifications:

- Master of Computer Applications
- B.Sc. Computer Science

Present Employment	Name of Employer: Experion Technologies India Private Limited	
	Address of Employer: 407,Thejaswini,Technopark Campus, Thiruvananthapuram- 695 581	
	Telephone - 91 471 3047317, 3047312	Contact
	Fax	Telex
	Job title of candidate	Years with present employer – 10 years

From	To	Company (Project/ Position/ Relevant technical and managerial experience
Aug 2019	Ongoing	TRL Limited, UK – Solution Architect. Provide technical support for the various customers iROADS product. The responsibilities include, • Design and development of the various feature enhancements • Analysis & Development of interfaces between different Systems • Analyse the issues and help the technical team with the solutions • Keeping the client informed about the progress of the support request
July 2018	Jan 2019	TRL Limited, UK – Solution Architect for the iROADS PFI module. PFI module allows the customers to calculate the road

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		condition indices from the condition data collected as part of various surveys, and produce reports based on the calculated condition indices. The specific activities include, • Design and development of the various feature enhancements • Analysis & Development of interfaces between different Systems • Coordination of technical research and development works for the project • Preparation of various technical as well as non-technical documents on the project • Development of Data Migration process from the existing system • Development, Deployment of the application
May 2017	Ongoing	TRL Limited UK – Provide technical support for TfL UK, Isle of Wight (IOW), Nigeria and Sheffield customer on iROADS product. The responsibilities include, • Analyse the issues and help the technical team with the solutions • Keeping the client informed about the progress of the support request
May 2017	June 2018	TRL Limited, UK – Solution Architect for the iROADS re-engineering project. The objective of the project is to discuss with iROADS Subject Matter Experts, and understand the functional details of the features within the iROADS product. The specific activities included but were not limited to: • Design and development of the various feature enhancements • Analysis & Development of interfaces between different Systems • Coordination of technical research and development works for the project • Preparation of various technical as well as non-technical documents on the project • Development of Data Migration process from the existing system • Development, Deployment of the application
Apr 2018	Till date	Traffic Management and Road Safety Unit (TMRSU), Mauritius – Technical Architect for the Road Accident Database system. The responsibilities include, • Requirement Gathering Process and User Requirement Specification Preparation

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		• As-Is Business Process Study and To-Be Business Process Preparation • Gap Analysis • Involved in meetings with different stakeholders to understand their current business process • Participated in requirement specifications preparation for the enhancements in the system • Design and development of the various feature enhancements • Data analysis and preparation of data analysis report • Development, Deployment of the application
Aug 2015	Aug 2018	Ashghal, Qatar – Onsite Technical Team Lead for the road accident database management system. The responsibilities include, • Process Study of existing business • Analysis & Development of interfaces between different Systems • Participated in requirement specifications preparation for various analysis modules • Design and development of various analysis modules • Data analysis and preparation of data analysis report • Deployment of the application and preparation of deployment manual • Coordination of technical research and development works for the project
Aug 2015	Mar 2017	United Nations Development Programme, Kuwait – Onsite Technical Team Lead for Road Safety Management System for Kuwait project. The responsibilities include but are not limited to: • Analysis & Development of interfaces between different Systems • Participated in requirement specifications preparation for various analysis modules • Design and development of various analysis modules • Data analysis and preparation of data analysis report • Deployment of the application and preparation of deployment manual • Coordination of technical research and development works for the project • Preparation of various technical as well as non-technical documents on the project
Aug 2014	Jul 2015	Himachal Pradesh State Roads Project (HPSRP), India – Technical Architect for the Consulting Services: Provide,

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		customize & implement a Road Crash Data Management System (RADMS) project. Specific activities include but are not limited to: • Requirement Gathering Process and User Requirement Specification Preparation • As-Is Business Process Study and To-Be Business Process Preparation • Gap Analysis • Involved in meetings with different stakeholders to understand their current business process • Participated in requirement specifications preparation for the enhancements in the system • Design and development of the various feature enhancements • Data analysis and preparation of data analysis report • Development, Deployment of the application
Jun 2012	Apr 2013	TRC, Oman – Technical Team Lead for the Project - Road Accident Database System. Specific activities include but are not limited to: • Business Analysis of the existing system • User Requirement Specification Preparation, Gap Analysis, Solution Architecture Preparation • Analysis & Design of interfaces between different systems like Emergency Medical Service, Health System • Development of Data Migration process from the existing system • Deployment of application at the customer environment
Jul 2012	Jan 2013	National Road Safety Commission, Ghana – Technical Lead for the Development of Road Accident Data Management System for Ghana project. Specific activities included but were not limited to: • Business Analysis of the existing system • User Requirement Specification Preparation, Gap Analysis, Solution Architecture Preparation • Development of Data Migration process from the existing system • Deployment of application at the customer environment • Participated in requirement specifications preparation for various analysis modules • Analysis & Design of interfaces between different systems like Driver Licensing System (DVLA). • Development of Data Migration process to migrate the

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		data from the existing system
Sep 2011	Dec 2012	DoT, Abu Dhabi – Technical Lead for the Provision of a Crash Data Analysis and Reporting System project. Specific activities included but were not limited to: • Requirement Gathering Process and User Requirement Specification Preparation • As-Is Business Process Study and To-Be Business Process Preparation • Gap Analysis, Involved in meetings with different stakeholders to understand their current business process • Arranged meetings with different stakeholders to finalize the interfacing process • Analysis & Development of interfaces between different Analysis • Participated in requirement specifications preparation for various analysis modules • Design and development of various analysis modules • Solution architecture document preparation • Data analysis and preparation of data analysis report • Location correction algorithm preparation • Deployment of the application and preparation of deployment manual • Design and development of Data Migration process to migrate the data from the existing system • Onsite coordination of deployment activities • Impact analysis of various change requests

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Position Senior Software Developer		Candidate ✓ Prime
Candidate Information	Name of Candidate Francis Sajay	Date of Birth 30-May-1985
	Professional Qualifications: • Master of Computer Applications • Bachelor of Science (Mathematics)	
Present Employment	Name of Employer: Experion Technologies India Private Limited	
	Address of Employer: 407,Thejaswini,Technopark Campus, Thiruvananthapuram- 695 581	
	Telephone - 91 471 3047317, 3047312	Contact
	Fax	Telex
	Job title of candidate	Years with present employer – 10 years

From	To	Company (Project/ Position/ Relevant technical and managerial experience
Aug 2019	Ongoing	TRL Limited, UK – Provide configuration and technical support for Isle of Man customer for iROADS product. The responsibilities include, • Resolving problems in the production environment using remote access. License updates, in case of license expiry for any clients. • Fixing defects in the Software, after discussion with the business team. • Keeping the client informed about the progress of the support request • Preparation and Submission of Quarterly Support and maintenance Reports
July 2018	Jan 2019	TRL Limited, UK – Technical Lead for the iROADS PFI module.

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		PFI module allows the customers to calculate the road condition indices from the condition data collected as part of various surveys, and produce reports based on the calculated condition indices. The specific activities include, • Arrange and participate in the meetings with TRL Expert team • Prepare Requirement Understanding Documents for the various within the system • Prepare workflow diagrams • Share the Requirement Understanding Documents for review and incorporate the review comments • Prepare system requirement specifications for the various features In the system.
May 2017	Ongoing	TRL Limited UK – Provide technical support for TfL UK, Isle of Wight (IOW), Nigeria and Sheffield customer on iROADS product. The responsibilities include, • Analyse the issues and help the technical team with the solutions • Keeping the client informed about the progress of the support request • Preparation of Quarterly Support and maintenance Reports
May 2017	June 2018	TRL Limited, UK – Technical Lead for the iROADS re-engineering project. The objective of the project is to discuss with iROADS Subject Matter Experts, and understand the functional details of the features within the iROADS product. The specific activities included but were not limited to: • Participated in requirement specifications preparation for various analysis modules • Design and development of various analysis modules • Deployment of the application and preparation of deployment manual • Coordination of technical research and development works for the project • Prepare workflow diagrams • Share the Requirement Understanding Documents for review and incorporate the review comments • Prepare system requirement specifications for the various features In the system.
Aug 2015	Aug 2018	Ashghal, Qatar – Offshore Implementation Lead for the road accident database management system. The responsibilities include, • Analysis & Development of interfaces between different

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		Systems • Participated in requirement specifications preparation for various analysis modules • Design and development of various analysis modules • Data analysis and preparation of data analysis report • Deployment of the application and preparation of deployment manual • Coordination of technical research and development works for the project
Aug 2015	Mar 2017	United Nations Development Programme, Kuwait – Offshore Implementation Lead for Road Safety Management System for Kuwait project. The responsibilities include but are not limited to: • Analysis & Development of interfaces between different Systems • Participated in requirement specifications preparation for various analysis modules • Design and development of various analysis modules • Data analysis and preparation of data analysis report • Deployment of the application and preparation of deployment manual • Coordination of technical research and development works for the project
Dec 2013	Jul 2014	Dubai RTA – Technical and Implementation Lead. Specific activities include but are not limited to: • Requirements Gathering and Preparation of User Requirement Specification • Development • Deployment of application at customer environment • Testing of the application • Conducted User Acceptance Testing • Customer Training
Jun 2012	Apr 2013	TRC, Oman - Offshore Team Lead for the Project - Road Accident Database System. Specific activities include but are not limited to: • Business Analysis of the existing system • As-Is Business Process Study and To-Be Business Process Preparation • Gap Analysis. • Involved in meetings with different stakeholders to understand their current business process • Requirement Gathering Process and User Requirement

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		Specification Preparation • Prepared Acceptance Test Cases • Solution Architecture Preparation • Arranged meetings with different stakeholders to finalize the interfacing process • Analysis & Development of interfaces between different systems • Development of Data Migration process from the existing system • QA Testing • iMAAP Training to the different stakeholders
Sep 2011	Dec 2012	DoT, Abu Dhabi – Onsite Implementation Lead for the Provision of a Crash Data Analysis and Reporting System project. Specific activities included but were not limited to: • Participated in requirement specifications preparation for various analysis modules. • Reviewed URS documents • Prepared test plans and prepared QC Test Cases for all assigned project releases • Prepared Acceptance Test Cases • Prepared Acceptance Test Cases for the iMAAP CARS Implementation and shared it with client • Ensured that all the test cases are updated and uploaded in the SVN • Ensure that all the test cases were executed and the test reports were uploaded in SVN • Ensure that all the QC processes were followed by the team members

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Position Mobile Application Developer		Candidate ✓ Prime
Candidate Information	Name of Candidate Manu Murukan	Date of Birth 04-May-1983
	Professional Qualifications: Bachelor of Technology in Computer Science	
Present Employment	Name of Employer: Experion Technologies India Private Limited	
	Address of Employer: 407,Thejaswini,Technopark Campus, Thiruvananthapuram- 695 581	
	Telephone - 91 471 3047317, 3047312	Contact
	Fax	Telex
	Job title of candidate	Years with present employer – 7.5 years

From	To	Company (Project/ Position/ Relevant technical and managerial experience
July 2018	Jan 2019	TRL Limited, UK – Solution Architect for the iMAAP Mobile Application development project. The specific activities include, • Development, Deployment of the application • Requirements Elicitation and Analysis, • Product Design, • Product Development (Mobile and Web), • Deployment and Testing
Apr 2018	Till date	Traffic Management and Road Safety Unit (TMRSU), Mauritius – Technical Architect for the Mobile Application. Responsibilities include, • Development, Deployment of the application • Requirements Elicitation and Analysis, • Product Design, • Product Development (Mobile and Web), • Deployment and Testing
Aug 2015	Aug 2018	Ashghal, Qatar –Technical Team Lead for the mobile application development team. The responsibilities include, • Development, Deployment of the application • Requirements Elicitation and Analysis, • Product Design, • Product Development (Mobile and Web), • Deployment and Testing
Aug	Mar	United Nations Development Programme, Kuwait – Technical Team Lead for

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2015	2017	Road Safety Management System for Kuwait project. The responsibilities include but are not limited to: • Analysis & Development of interfaces between different Systems • Participated in requirement specifications preparation for various analysis modules • Design and development of various analysis modules • Data analysis and preparation of data analysis report • Deployment of the application and preparation of deployment manual • Coordination of technical research and development works for the project • Preparation of various technical as well as non-technical documents on the project
Aug 2014	Jul 2015	Himachal Pradesh State Roads Project (HPSRP), India – Team Lead for the mobile application. Specific activities include but are not limited to: • Requirement Gathering Process and User Requirement Specification Preparation • As-Is Business Process Study and To-Be Business Process Preparation • Gap Analysis • Involved in meetings with different stakeholders to understand their current business process • Participated in requirement specifications preparation for the enhancements in the system • Design and development of the various feature enhancements • Data analysis and preparation of data analysis report • Development, Deployment of the application • Provide training to the users
Jun 2012	Apr 2013	TRC, Oman – Technical Team Lead for the Project - Road Accident Database System. Specific activities include but are not limited to: • Analysis & Design of interfaces between different systems and mobile application • Deployment of mobile application at the customer environment • Development of the mobile application • Testing of the mobile application • Training the users on mobile application
Jul 2012	Jan 2013	National Road Safety Commission, Ghana – Technical Lead for the Development of Road Accident Data Management System for Ghana project. Specific activities included but were not limited to: • Development, Deployment of the application • Requirements Elicitation and Analysis, • Product Design, • Product Development (Mobile and Web), • Deployment and Testing

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Sep 2011	Dec 2012	DoT, Abu Dhabi – Technical Lead for the Provision of a Crash Data Analysis and Reporting System project. Specific activities included but were not limited to: • Development, Deployment of the application • Requirements Elicitation and Analysis, • Product Design, • Product Development (Mobile and Web), • Deployment and Testing

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Annexure A – TRL Limited's Supporting Information [Financials]

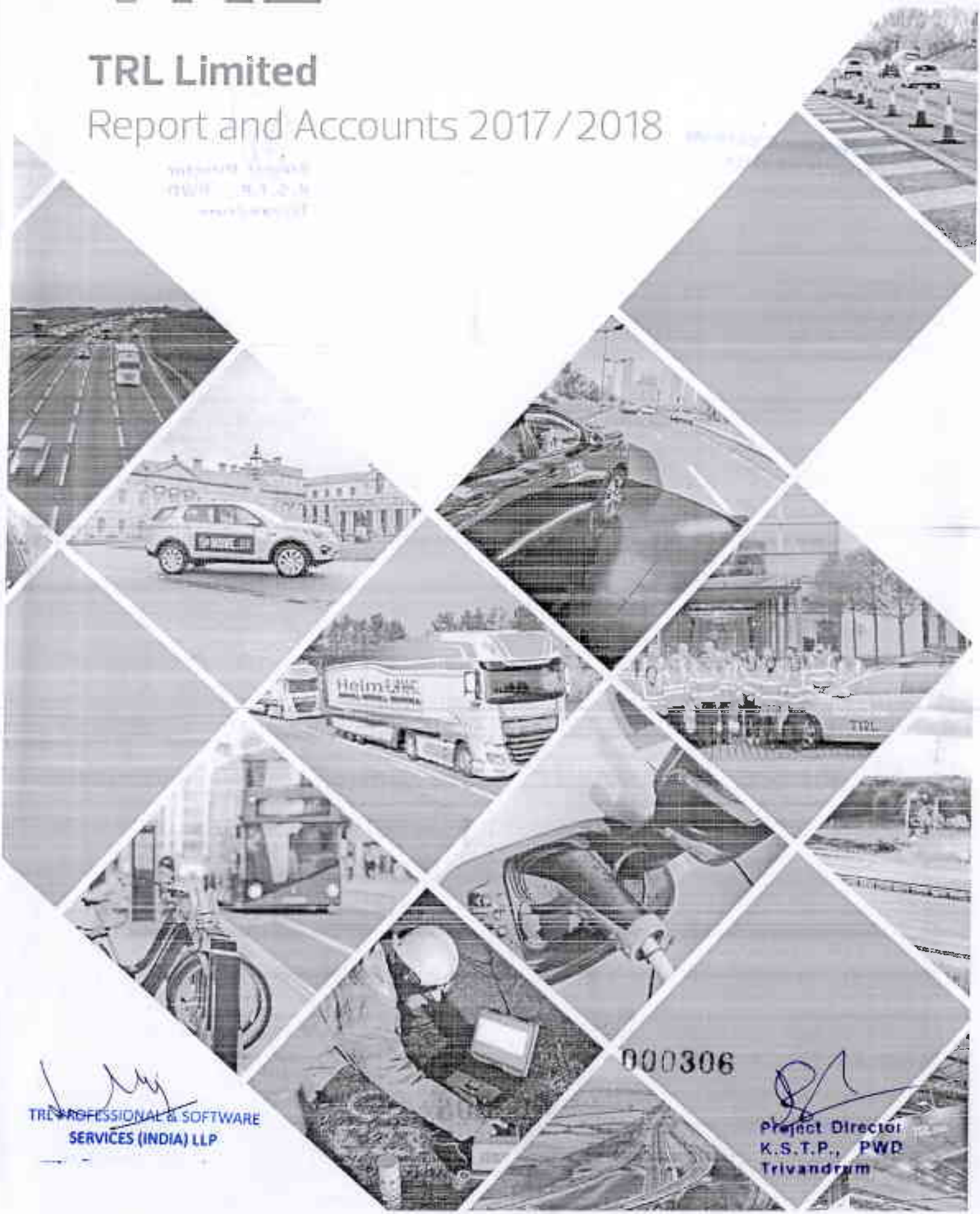
TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

TRL

TRL Limited

Report and Accounts 2017/2018



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TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

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TRL Limited

Reports and Financial Statements

30 June 2018

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP (F 3142272)

Project Director
K.S.T.P., PWD
Trivandrum

Corporate Information

Directors

Robert Wallis	Chief Executive
Peter Van Campen	Finance Director

Company Secretary
Peter Millard

Auditor
RSM UK Audit LLP
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One London Square
Cross Lanes
Guildford
Surrey
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Bankers
Lloyds Bank PLC
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Berkshire
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Website: www.trl.co.uk

Registered Number: 3142272

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
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Strategic Report

Company Profile

TRL Limited (TRL) is a global centre for innovation in transport and mobility. It provides world-leading research, technology and software solutions for surface transport modes and related market segments engaged in intelligent, new mobility innovations. Independent from government, industry and academia, TRL helps organisations create global transport systems that are safe, clean, affordable, liveable and efficient.

Established in 1933 by the British Government as the UK's Transport Research Laboratory, TRL was subsequently privatised in 1996. Today, TRL has more than 1,000 clients across 145 countries, driving positive societal and economic benefit worldwide.

Trading Highlights

I am very pleased to report a year of solid business performance in 2017/18, consolidating a 5-year transformation of the Company during my time as CEO.

My multi-year transformational agenda has been to gradually cease business activities (over 1/3rd of the Company's annual income of £30.4m in 2013) that are no longer relevant to the Company's future market opportunity, or contributing short-term value. Over time, these activities have been replaced with new, commercially valuable income streams that are more strongly aligned to the large, fast-growing and disruptive markets around new, intelligent mobility. Despite the withdrawal from certain activities, this shift in focus has also achieved cumulative turnover growth over 5 years, while increasing the enterprise value of the Company.

In 2017/18 specifically, the table (Fig 1) evidences a strong financial performance, underpinned by a very positive year in executing the Company's strategy for future sustainability and value creation. For clarity, the challenging prior year (2016/17) results primarily reflect exceptional costs for a major re-structuring of the Company's UK Headquarters property lease and associated services, crystallising substantial cost savings across the coming 10 years and beyond. Prior periods since 2013 were profitable/cash-generative at an operating level.

	30th June 2018	30th June 2017
Sales/New Contracts	**£40.4m**	£31.1m
Turnover	**£32.6m**	£31.2m
Gross Profit	**£14.4m**	£15.1m
Gross Profit Margin	**44.0%**	48.6%
Profit/(Loss) Before Interest, Tax, Depreciation & Amortisation	**£1.7m**	£(1.0)m
Profit/(Loss) Before Interest & Tax	**£1.1m**	£(3.5)m
Cash	**£4.4m**	£2.4m

Fig 1 Extracts from audited accounting periods of 2017/18 and 2016/17.

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Project Director
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Strategic Report

(continued)

The Company achieved a record sales performance, competitively winning over £40m in new contracts, a scale not seen in its history since privatisation in 1996. The mix of these contracts is also far more aligned to future market needs, with new projects (by example) in vehicle platooning, ride-sharing services, vehicle electrification and artificial intelligence validation, all positioning the Company more strategically and competitively.

Turnover increased by 4.6%, although taking account of a strategic decision to scale back local Middle-East based activities, the adjusted, underlying turnover growth across the wider business equates to 11.5%.

Profitability and cash generation were materially higher than the prior year, even when taking account of prior year exceptional costs that diluted underlying performance. 2017/18 includes over £0.8m of strategic investments/one-off costs, while adjusted, underlying PBIT performance was otherwise £1.9m (5.8% margin).

The business continued its strategic investment programme, including development of critical skills and knowledge areas, software product development (traffic, safety, environmental and asset management systems) and market development (particularly India). The multi-year investment strategy is evidencing returns by achieving a record order book of new contracts for 2018/19 and beyond, both in volume and quality, underpinning TRL's global brand positioning.

The Company continues to focus on creating an increasingly diversified and resilient business, achieved from public and private sector clients in the UK, with a continued international focus centred on Europe, India, Africa & Middle East, supported by strategic collaborations in North America and Asia Pacific.

Despite intentional and sizeable cash out-flows in the prior year, the business positively managed its working capital in the period, almost doubling its cash overall. The business did not utilise its overdraft or revolving credit facilities, which remain in place with the continued backing of the Company's banking relationship with Lloyds.

Strategy

The senior leadership team, with input from clients, stakeholders and employees, further developed and updated the Company strategy. This validated existing plans, while specifically focusing on key industry segments and carefully selected international territories.

Our vision for TRL reflects our ambition to be a "world leader in creating the future of transport and mobility, using evidence based solutions and innovative thinking".

Our mission in support of this is to "challenge and influence our chosen markets, driving sustained reductions (ultimately to zero) in:

- fatalities and serious injuries (Safe)
- harmful emissions (Clean)
- cost inefficiencies (Affordable)
- barriers to inclusive mobility (Liveable)
- unforeseen delays (Efficient)

enabling world-class transport and mobility solutions that underpin the needs of tomorrow's economy and society".

The strategy includes the development of innovative, repeatable propositions based on TRL's world-leading knowledge and expertise, including new, thought-leading areas associated with future transport and mobility.

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP (LLP 3142272)

Project Director
K.S.T.P., PWD
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Strategic Report

(continued)

Thought Leadership

Through the TRL Academy, the Company's in-house research institute, TRL has materially increased its external market engagement and participation in thought-provoking topics. In many instances, TRL is a leading voice in these debates through its deep and long-established credentials as an evidence-based research organisation that provides pragmatic and safe ways to deploy new, innovative thinking for transport and mobility solutions.

Today, the Company is strategically investing and delivering projects linked to:

- Connected & self-driving vehicles
- Ultra-low emission technologies
- Shared mobility services
- Intelligent asset information
- Big data, machine learning and artificial intelligence.

By example, TRL has been instrumental in publishing world-leading opinions and papers on autonomous and driverless cars; a research area that TRL has been engaged in since the 1950's. This practical experience culminated in TRL securing a leading or strategic role in more than £60m of projects for Connected & Autonomous Vehicles (CAV) since 2016. In addition, TRL has been leading the creation of the Smart Mobility Living Lab (SMLL) in London, having successfully secured c£20m of government and private sector funding. The SMLL presents an innovative means of undertaking CAV research in a truly immersive live environment, now already hosting multiple projects.

In relation to ultra-low emission vehicles, TRL leads some of the latest thinking in their adoption, and is undertaking multiple projects evaluating the implications of electric vehicle usage and their associated charging solutions. These projects range from the practical robustness of static wireless power transfer solutions for charging fully electric buses in eleven major cities across Europe through to the implications on consumers of purchasing electric vehicles and the effect on energy supply and how market structures are likely to change.

For smart cities and shared mobility, TRL is increasingly participating in the growing revolution of how people consume their mobility needs. The traditional purchase of the motor car is being challenged by smart urban solutions – be they highly integrated and efficient public transit solutions, or the increasing popularity of mobility-as-a-service (MAAS) through the introduction of technology-led, on-demand services. A paradigm shift is now evident in the automotive industry, involving multi billion investments, towards smart mobility services.

In considering tomorrow's transport and mobility infrastructure, it is more than just about capacity and availability, but also having a level of real-time intelligence and connectivity. TRL continues to work on new innovative research into integrated sensor technologies embedded within asset infrastructure, and the evolving needs for intelligent remote condition monitoring and control. This work is increasingly linked to activities in Vehicle to Vehicle (V2V) and Vehicle to Infrastructure (V2I) technological advances being developed in conjunction with major automotive companies and leading global government stakeholders.

Underpinning much of the new thought leadership activities at TRL is the increasing proliferation of information in the form of Big Data, Machine Learning and the use of Artificial Intelligence (AI). So much data is being captured by today's transport and mobility solutions, although few services fully leverage the opportunities provided by aggregation of such data (notwithstanding the implications on data privacy and cyber security). TRL is actively engaged on projects to inform governments and industry on how to navigate this complex area.

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Project Director
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Strategic Report

(continued)

UK Market Engagement

As an internationally designated Research & Technology Organisation (RTO) and a commercial limited company business, TRL continued its role as an independent organisation in support of its major UK Government clients, providing thought-leading insight to underpin strategic, operational and policy decisions. Examples include:

- Major new programmes into connected and autonomous vehicles, ultra-low emission vehicle technologies and intelligent asset infrastructure, including associated big-data and deep learning initiatives.
- Safety initiatives and investigations, delivering reduced fatalities and serious injuries, covering road, rail, cycling and pedestrian travel modes – for travellers and transport workers in hazardous environments.
- Independent policy advice relating to air quality, carbon and nitrous oxide emissions – in particular relating to vehicle pollutants from private motor cars and heavy truck supply-chain/logistical operations.
- Research into physical driving disabilities and specific conditions such as diabetes, dementia, head injury and stroke as well as the impact of mental health and cognitive decline - especially in older drivers.
- Reducing congestion and journey times within urban and inter-urban environments using smart, adaptive traffic control technologies and software solutions, linking with new connected-vehicle innovations.
- Optimising investments into asset design, maintenance and operation, while improving the traveller experiences across multiple surface transport operations, especially strategic and local roads.

TRL also delivers valuable services to its private sector client portfolio, especially with leading automotive, motorsport, insurance and energy organisations. Examples include:

- Behavioural research helping vehicle manufacturers better understand the ergonomic and cognitive implications of its driver-assist initiatives, with the ever-increasing complexity of in-vehicle technologies.
- Forensic investigations into vehicle incidents involving death or serious injuries, providing insurers with independent expert evidence. This supports liability disputes while identifying preventative interventions.
- Evidence-based assessments into the changing energy demands of society with the uptake and usage of alternative propulsion systems for vehicles, particularly electric vehicles and their charging requirements.
- Research and guidance, including technology roadmaps, considering adoption of connected and autonomous vehicle technologies and associated smart infrastructure standards.

In addition to hosting visits by UK ministers, senior civil servants and senior executives from private sector companies, there were further delegations coming to TRL from around the world, wanting to learn about its expertise and innovative ideas for surface transport; these included delegations from countries in Europe, Middle East & Africa, plus Israel and Australia.

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Project Director
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Strategic Report

(continued)

International

TRL's international engagement is broad geographically, and diverse in its content. TRL's activities in the period relate to organisations located across 145 countries, gaining value through the use of TRL's products and services. The international dimension to TRL's business enables it to transfer valuable knowledge and experience to other countries, promoting the excellence of 'UK Plc', while also learning from the cultural, environmental and jurisdictional differences that occur in other countries, enabling TRL to bring that tangible experience to its UK and other international clients.

Participation in major research programmes in Europe continued to be a focus. TRL continued to influence the European agenda through its direct work on varying research programmes, coupled with its membership of relevant European industry bodies that are at the forefront of innovation in surface transport initiatives. BREXIT creates some uncertainty, although TRL expects to continue engaging positively with Europe post-BREXIT.

Through its offices in the Middle East (Qatar and United Arab Emirates), TRL continued to maintain a presence in the region, although the Company is actively changing the nature of its activities in the region and shifting to a partnering model. TRL completed a range of research, consulting and software projects in areas of road safety, vehicle safety, incident investigation, asset maintenance and sustainability, air quality and highway standards.

TRL's focus on Africa continued to provide new opportunities and interesting projects, including Ethiopia, Gambia, Ghana, Kenya, Mozambique, Nigeria and Tanzania. These programmes are typically focused on asset maintenance or road safety initiatives, secured through the UK's Department for International Development (DFID), or in region with public sector entities, fund[illegible]elopment bank organisations.

Having recently established operations (legal entity) in India as part of its strategy, new contracts have been secured and delivered successfully for national and regional government clients, especially relating to road safety, asset maintenance and traffic management programmes. There continues to be an increasing pipeline of market opportunity, particularly relating to smart cities and vehicle electrification.

TRL continues to support the World Health Organisation and the United Nations in their 'Decade of Action for Road Safety' with a variety of tangible, evidenced initiatives that have reduced deaths and serious injuries in many countries around the world. Linked to this important work, TRL was again recognised within the International Road Safety Awards programme, hosted by Prince Michael of Kent, Patron of the Commission for Global Road Safety. TRL continues to be the 'most awarded' research organisation in the 30-year history of this prestigious and globally impactful charity.

TRL's software portfolio continues to play a small, but strategically valuable role for the Company. New business and sustainable profits from the portfolio were strong, but this business activity is also undergoing a major investment programme to further position itself for future market growth. In particular, the transformation of its traffic software portfolio, coupled with its accident management & investigations software was particularly successful, especially in the Middle East and India. The portfolio of TRL's asset management software, focused on local and rural road segments, continued to deliver sustained value to clients and create increasing international opportunities for growth.

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
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Strategic Report

(continued)

People

Many of the core competencies of TRL and the wider Company reside in its people. The depth and breadth of the scientific and technical expertise are regularly cited on an international basis by TRL's clients, partners and industry stakeholders.

TRL's policies and practices towards people have been assessed and accredited under the Investors in People scheme for 17 years and is currently recognised at Silver level. In addition, the business undertakes an in-depth employee engagement survey every two years, linked to a continuous improvement regime.

A critical focus in the period has been the continued emphasis on attracting, retaining and developing the core assets of the Company, its people. Although the business has seen an increase in voluntary staff turnover in the period, this has remained within industry norms.

Substantive investments and personal coaching have been made to deepen the functional disciplines of leadership, business development/commercial, project management and programme delivery; in many cases linked to industry-recognised standards.

A key factor in building the scientific and engineering competencies of TRL and the wider Company is the extent to which its people can engage and share knowledge with other industry-leading experts. As such, TRL is represented in international research associations, managed through the framework of the TRL Academy, which has a particular focus in:

- Building strong and truly collaborative relationships with key university departments in order to maximise funding opportunities through partnerships.
- Managing the Company's programme of re-investment (of its commercial profits) back into developing expertise in its people. This investment is targeted at 'emerging areas' where TRL seeks to develop new, thought-leading areas of innovation for industry.
- Investing in specific people pursuing PhDs at several universities, including the use of TRL's Open University 'Affiliated Research Centre' status.

Overall, TRL recognises that, although much of its heritage from its inception in 1933 (while originally part of the UK Government) has involved substantial investments in the creation of sophisticated testing facilities and research laboratories, TRL remains, at its heart, a knowledge business. Continuously investing in people to build deeper and broader knowledge and expertise, ensuring TRL continues to create the future of transport and mobility, remains the critical focus.

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director,
K.S.T.P., PWD,
Trivandrum

Strategic Report

(continued)

Principal Risks and Uncertainties

There are a range of risks and uncertainties facing the Company. The examples below are not intended to be exhaustive, but comprise the principal risks that the directors believe could have a significant impact on the Company's performance:

- **Macro-Economic Conditions:** The Company continues to operate a diversified portfolio, securing business from a combination of public and private sector clients in the UK, coupled with a broad international profile of clients across many countries. Despite the success of this diversification, a material downturn in the UK economy could pose a risk to Company performance.
- **Framework Contracts:** Despite substantial success in diversifying its business in the last few years, the Company is somewhat reliant on certain major UK public sector clients for contracts awarded under framework agreements, which are subject to periodic competitive tender. The Company is seeking to better position itself to ensure it is well placed to win future UK public sector contracts, while continuing to diversify into private and international markets.
- **Pension Deficit:** The Company continues to have a defined benefit pension scheme deficit, details of which are contained within note 16. The directors have agreed with the scheme trustees an on-going plan to deal with this deficit. The Company's strategic plan, already evidencing signs of value creation, seeks to insulate the Company from negative variations to the pension scheme deficit.
- **Employees:** The Company's continued competitive and reputational success depends on having sufficient employees with appropriate knowledge and expertise. TRL is essentially a knowledge business, with employees as its major asset. There is the risk that if the Company loses, or fails to attract, employees of the requisite calibre, this could adversely impact the business. The Company seeks to mitigate this risk by investing in appropriate professional development, remuneration incentives and focused recruitment.

The Directors maintain a Company risk register that identifies and evaluates risks as soon as possible, while co-ordinating the implementation of suitable measures to mitigate such risks. The risk register is reviewed at least every three months, with each identified risk having a 'risk-owner' within the senior leadership team.

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Project Director
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Strategic Report

(continued)

Outlook

Following investments and restructuring decisions made throughout the last 5 years, coupled with the strong trading in the period, including record order book levels and an increasing cash balance, the Company is confident in the foundations it has now set. During 2018/19, the business is anticipating a further upturn in turnover and profitability, assuming no material negative impact from the final BREXIT arrangements.

Trading will continue to focus on the Company's public and private sector clients in the UK, linked with further deepening of its international activities in Europe, India, Africa & Middle East markets. The Company's industry focus will continue to be core surface transport sectors (e.g. strategic & local roads, cities & urban, government policy and standards), linked with relevant areas of automotive, motorsport, insurance and energy sectors around the 'new mobility' agenda.

The Company's current banking arrangements with Lloyds Bank plc, include multi-million financing facilities that are supplementary to the Company's own cash reserves; these further enable acquisitive investments and ventures to be made, where appropriate.

Rob Wallis
CEO

19 September 2018

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

Directors' Report

The Directors present their report and the financial statements for the year ended 30 June 2018.

Principal activities

The principal activities of the Company encompass a range of research, technology and software solutions for surface transport modes and related markets of automotive, motorsport, insurance and energy.

Research and development

As well as performing research projects for its customers, the Company also funds its own programme of innovative research, managed through the TRL Academy, which is mainly delivered internally by the Company's personnel.

Directors of the Company

The Directors who served during the year were as follows:

R Wallis

P Van Campen

No Director has had any interests in the share capital of the company or its subsidiaries.

The Board ensures that the Company operates with effective systems and controls. These ensure that both authority and accountability are clearly defined. They also ensure that risks are appropriately managed.

The Company has a Senior Leadership Team. It is this team's responsibility to ensure that the Board has timely, accurate and relevant information to enable it to carry out its responsibilities.

Employees

The average weekly number of employees for the year ended 30 June 2018 was 312 (2017: 341).

Going concern

The Company's business activities, together with the factors likely to affect its future development, and the financial position of the Company are set out in the Strategic Report.

The Company uses cash flow forecasts derived from the budget and medium-term planning to identify future funding requirements. The Company meets its day to day working capital requirements through operating cash flow, with borrowings in place to fund acquisitions, capital expenditure and bonding requirements. The Transport Research Foundation Group, which includes the Company, had £4.15m (2017: £4.15m) of undrawn committed facilities as at 30 June 2018.

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Directors' Report

(continued)

The Company has a pension scheme deficit that, measured under Financial Reporting Standard (FRS) 102, was £19.5m (2017: £26.3m) at the end of June 2018. This liability is due to unwind over a long period of time and scheme payments by the Company are pre-set every three years as part of a triennial funding review.

The Company's forecasts and projections, taking account of reasonable changes in trading performance, confirm that the Company should be able to operate within the level of its banking facility and pension funding commitments.

After making enquiries and having evaluated the on-going trading of the business, the Directors have reasonable expectations that the Company has adequate resources to continue to operate for a period considered to be at least 12 months from the date of this report. Accordingly, the Directors consider it appropriate to continue to adopt the going concern basis of accounting in preparing the Company's Annual Reports and Financial Statements.

Future developments

The Company will continue to seek opportunities to develop its new business through diversification into new geographies and services as well as ensure that its existing valuable customer base remains fully satisfied with its current provision of research, technology and software solutions. The Company continues to have Branch locations in Abu Dhabi, Dubai and Qatar.

In addition, the Directors will continue to look for appropriate acquisitions to add to the Company.

Employee involvement

The employment policies of the Company embody the principles of equal opportunity and the Company does not discriminate against anyone on any grounds. Employment arrangements are intended to be fair, equitable and consistent with the skills and abilities of the employee and the needs of the business. It is Company policy to comply with all applicable laws governing employment practices. The Company ensures that every consideration is given to applications of employment from disabled persons. If an employee becomes disabled, reasonable adjustments will be made to retain an employee in employment.

The Company operates a framework for employee information and consultation which complies with the requirements of the Information and Consultation of Employees and Regulations 2004. The Company keeps employees informed via the Company's SharePoint intranet site and by periodic "Town Hall" meetings and internal announcements, and takes account of any comments and feedback provided directly by employees, or through the Employee Council, in the formulation of its policies and procedures.

The Board would like to thank all employees of the Company for the valuable contribution that they made during the year.

SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
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Directors' Report

(continued)

Gender pay gap

Our people are key to our competitive advantage and it is, therefore, essential that we are able to recruit and retain staff from the widest possible talent pools. To support this, we are committed to being recognised as an employer of choice, creating an inclusive working environment in which all staff feel valued and respected, where opportunities are accessible to all, and where diversity and flexibility in our working and employment practices is embraced. The full Gender Pay Gap statement is available in full on our website via www.trl.co.uk/about-us/assurance-independent-certification.

Modern slavery policy statement

We take responsibility for our impact on society, and our Modern Slavery Policy Statement sets out the steps TRL has taken to ensure that slavery and human trafficking is not taking place in our supply chains or in any part of our business. The statement is available in full on our website via www.trl.co.uk/about-us/assurance-independent-certification.

Environmental policy

The Company is committed, by means of target setting, monitoring and periodic audits, to ensure that environmental issues are considered in planning our business and managing our operations and to comply with the requirements of environmental legislation, regulations and codes of practice.

The Company will minimise pollution, reduce waste, reduce the consumption of natural resources, and promote recycling and re-use and assist contractors, suppliers and clients to develop a similar approach to protection of the environment. It will also promote green travel, seek to continually improve its environmental performance and provide the necessary training and support to its staff to ensure that they are able to fulfil these commitments.

Certifications

The Company is currently certified to the following standards:

ISO 9001:2015 – Quality Management System Requirements

ISO 14001:2015 – Environmental Management System

OHSAS 18001:2007 – Health & Safety Management System

ISO 27001:2013 – Specification for Information Security

ISO/IEC 17025:2017 – Testing Laboratory Management System Requirements

In addition to its formal certifications, the Company's Anti-Bribery policy adopts some of the principles established in other Standards such as BS 22301 (Business Continuity), ISO 44001 (Collaborative Relationships) and BS 10500 (Anti-Bribery) as appropriate for the business.

TRL PROFESSIONAL SOFTWARE SERVICES (INDIA) LLP (Company Number 3142272)

090319

Project Director
K.S.T.P., PWD
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Directors' Report

(continued)

Directors' and Officers' liability insurance

During the year the Company purchased and maintained liability insurance for its Directors and officers as permitted by section 234 of the Companies Act 2006.

Dividend

The Directors do not recommend the payment of a dividend (2017: £nil).

Disclosure of information to Auditor

The Directors who held office at the date of approval of this Directors' Report confirm that, so far as they are each aware, there is no relevant audit information of which the Company's auditor is unaware and each Director has taken all steps that they ought to have taken as a Director to make them aware of any relevant audit information and to establish that the Company's auditor is aware of that information.

Re-Appointment of Auditor

In accordance with s485 of the companies Act 2006, a resolution is to be proposed for re-appointment of RSM UK Audit LLP as auditor of the Company.

Directors' responsibility statement

The Directors are responsible for preparing the Strategic Report, Directors' Report and the financial statements in accordance with applicable law and regulations. Company law requires the Directors to prepare financial statements for each financial year. Under that law the Directors have elected to prepare the Company financial statements in accordance with United Kingdom Generally Accepted Accounting Practice (United Kingdom Accounting Standards and applicable law).

Under company law, the Directors must not approve the financial statements unless they are satisfied that they give a true and fair view of the state of affairs of the Company and of their profit or loss. In preparing these financial statements, the Directors are required to:

- Select suitable accounting policies and then apply them consistently;
- Make adjustments and accounting estimates that are reasonable and prudent;
- State whether applicable UK Accounting Standards have been followed, subject to any material departures disclosed and explained in the financial statements;
- Prepare the financial statements on the going concern basis unless it is inappropriate to presume that the Company will continue in business.

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

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Project Director
K.S.T.P., PWD
Trivandrum

Directors' Report

(continued)

The Directors are responsible for keeping adequate accounting records that are sufficient to show and explain the Company's transactions and disclose with reasonable accuracy at any time the financial position of the Company and enable them to ensure that the financial statements comply with the Companies Act 2006. They are also responsible for safeguarding the assets of the Company and hence for taking reasonable steps for the prevention and detection of fraud and other irregularities.

Approved by the Board of Directors and signed on its behalf by;

R Wallis
Chief Executive
19 September 2018

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

P Van Campen
Finance Director
19 September 2018

Project Director
K.S.T.P., PWD
Trivandrum

000321

Independent Auditor's Report

to the Members of TRL Limited

Opinion

We have audited the financial statements of TRL Limited (the 'company') for the year ended 30 June 2018 which comprise the Income Statement, Statement of Comprehensive Income, Statement of Changes in Equity, Statement of Financial Position and Notes to the Financial Statements, including a summary of significant accounting policies. The financial reporting framework that has been applied in their preparation is applicable law and United Kingdom Accounting Standards, including FRS 102 "The Financial Reporting Standard applicable in the UK and Republic of Ireland" (United Kingdom Generally Accepted Accounting Practice).

In our opinion, the financial statements:

- give a true and fair view of the state of the Company's affairs as at 30 June 2018 and of its profit for the year then ended;
- have been properly prepared in accordance with United Kingdom Generally Accepted Accounting Practice;
- have been prepared in accordance with the requirements of the Companies Act 2006.

Basis for opinion

We conducted our audit in accordance with International Standards on Auditing (UK) (ISAs (UK)) and applicable law. Our responsibilities under those standards are further described in the Auditor's responsibilities for the audit of the financial statements section of our report. We are independent of the company in accordance with the ethical requirements that are relevant to our audit of the financial statements in the UK, including the FRC's Ethical Standard, and we have fulfilled our other ethical responsibilities in accordance with these requirements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Conclusions relating to going concern

We have nothing to report in respect of the following matters in relation to which the ISAs (UK) require us to report to you where:

- the Directors' use of the going concern basis of accounting in the preparation of the financial statements is not appropriate; or
- the Directors have not disclosed in the financial statements any identified material uncertainties that may cast significant doubt about the Company's ability to continue to adopt the going concern basis of accounting for a period of at least twelve months from the date when the financial statements are authorised for issue.

Other information

The other information comprises the information included in the annual report, other than the financial statements and our auditor's report thereon. The directors are responsible for the other information. Our opinion on the financial statements does not cover the other information and, except to the extent otherwise explicitly stated in our report, we do not express any form of assurance conclusion thereon.

TRL PROFESSIONAL SERVICES (INDIA) LLP 42272)

000322

Project Director
K.S.T.P., PWD
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Independent Auditor's Report

to the Members of TRL Limited (continued)

In connection with our audit of the financial statements, our responsibility is to read the other information and, in doing so, consider whether the other information is materially inconsistent with the financial statements or our knowledge obtained in the audit or otherwise appears to be materially misstated. If we identify such material inconsistencies or apparent material misstatements, we are required to determine whether there is a material misstatement in the financial statements or a material misstatement of the other information. If, based on the work we have performed, we conclude that there is a material misstatement of this other information, we are required to report that fact.

We have nothing to report in this regard.

Opinions on other matters prescribed by the Companies Act 2006

In our opinion, based on the work undertaken in the course of the audit:

- the information given in the Strategic Report and the Directors' Report for the financial year for which the financial statements are prepared is consistent with the financial statements; and
- the Strategic Report and the Directors' Report have been prepared in accordance with applicable legal requirements.

Matters on which we are required to report by exception

In the light of the knowledge and understanding of the company and its environment obtained in the course of the audit, we have not identified material misstatements in the Strategic Report and the Directors' Report.

We have nothing to report in respect of the following matters in relation to which the Companies Act 2006 requires us to report to you if, in our opinion:

- adequate accounting records have not been kept, or returns adequate for our audit have not been received from branches not visited by us; or
- the financial statements are not in agreement with the accounting records and returns; or
- certain disclosures of directors' remuneration specified by law are not made; or
- we have not received all the information and explanations we require for our audit;

Responsibilities of Directors

As explained more fully in the Directors' Responsibilities Statement, the Directors are responsible for the preparation of the financial statements and for being satisfied that they give a true and fair view, and for such internal control as the Directors determine is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, the Directors are responsible for assessing the Company's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless the Directors either intend to liquidate the Company or to cease operations, or have no realistic alternative but to do so.

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Project Director
K.S.T.P., PWD
Trivandrum

Independent Auditor's Report

to the Members of TRL Limited (continued)

Auditor's responsibilities for the audit of the financial statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with ISAs (UK) will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

A further description of our responsibilities for the audit of the financial statements is located on the Financial Reporting Council's website at: http://www.frc.org.uk/auditorsresponsibilities This description forms part of our auditor's report.

Use of our report

This report is made solely to the Company's Members, as a body, in accordance with Chapter 3 of Part 16 of the Companies Act 2006. Our audit work has been undertaken so that we might state to the Company's Members those matters we are required to state to them in an auditor's report and for no other purpose. To the fullest extent permitted by law, we do not accept or assume responsibility to anyone other than the Company and the Company's Members as a body, for our audit work, for this report, or for the opinions we have formed.

RSM UK Audit LLP

Christopher Hurren FCA (Senior Statutory Auditor)
For and on behalf of RSM UK Audit LLP
Chartered Accountants
One London Square
Cross Lanes
Guildford
GU1 1UN

20 September 2018

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
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TRL Limited
Reports and Financial Statements

30 June 2016

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

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Corporate Information

Directors

Robert Wallis	Chief Executive
Peter Van Campen	Finance Director

Secretary

Peter Millard

Auditors

Ernst & Young LLP
Apex Plaza
Reading
Berkshire
RG1 1YE

Bankers

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Solicitors

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Telephone : +44 (0)1344 773131
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Website : www.trl.co.uk
Registered Number : 3142272

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Project Director
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Strategic Report

Overview

TRL Limited is a world leader in creating the future of transport and mobility, using evidence-based solutions and innovative thinking. The Company works to deliver societal and economic impact in more than 145 countries. It focuses on surface transport modes and related market segments.

The principal activities of the Company encompass a range of research, technology and software solutions. Founded in 1933 and originally part of the British Government as the UK's Transport Research Laboratory, the Company was privatised in 1996 to continue its work outside the umbrella of government as a wholly-owned subsidiary of the Transport Research Foundation.

The Company celebrates its 20-year anniversary as a private sector business in 2016. The Company is independent from government, industry and academia and funds its own programme of innovative research, using profits from its commercial activities.

Trading Highlights

The table (Fig 1) demonstrates a challenging year financially, underpinned and offset by a very positive year in executing the Company's strategy for future sustainability and value creation. The Company achieved a small increase in turnover, with improvements to gross profit on work delivered, although profit before interest and tax fell substantively. Cash flows remained strong, with a robust increase in the Company's cash position.

	30th June 2016 £'000	30th June 2015 £'000
Turnover	33,586	33,527
Gross Profit	12,381	12,147
Gross Margin	36.9%	36.2%
Profit Before Interest & Tax	945	1,766
PBIT Margin	2.8%	5.3%
Cash	3,934	3,255

Fig 1: Extracts from audited accounting periods of 2015/16 and 2014/15.

Expected turnover growth was not achieved due to a hiatus on major framework and long-term contracts with strategic public sector clients, while these were being re-competed; this diluted the growth achieved in other areas. Although this hiatus has now passed, and the Company successfully secured its position on a number of long-term strategic contracts, it lowered staff utilisation in the period and therefore affected profitability. Underlying increases in overhead costs moved only nominally, in line with market norms.

Despite this short-term trading challenge, the Company continued to invest in its market development activities, which is already evidencing a return by achieving a stronger order book of new contracts for 2016/17 and beyond, both in volume and quality.

The Company continues to focus on creating an increasingly diversified and resilient business, achieved from public and private sector clients in the UK, with continued expansion of the Company's international business in key emerging and growing markets of Middle East, Africa and now India, together with a wider Rest of World focus for some repeatable product and service propositions. Today, some one third of the Company's business is driven by international clients, with some one third relating to UK private sector clients, and only one third relating to the UK public sector.

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Project Director
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Strategic Report
(Continued)

Senior Leadership Changes

In reaching the end of this financial year in June 2016, the CEO of the Company has been in post for almost three years, having taken full responsibility when the predecessor left in October 2013.
During the last twelve months, further planned changes to the senior leadership team have occurred, although continuing the focused model of three operating divisions, coupled with functional and market-aligned roles including marketing, sales, international development, human resources and the TRL Academy.
Of the eight members of the senior leadership team reporting to the CEO, the Infrastructure operating division has a new Director, while the Engineering & Technology operating division will have a new Director in the autumn of 2016. All other roles remained unchanged. Note that the senior leadership team consists of three from internal promotions, with five being externally recruited.

Strategy

The senior leadership team, with input from clients, stakeholders and employees, further developed and updated the Company strategy. This validated existing plans, while specifically focusing on key industry segments and carefully selected international territories.

- Our vision for the Company reflects our ambition to be a "World leader in creating the future of transport and mobility, using evidence-based solutions and innovative thinking".
- Our mission in support of this is to "Challenge and influence our chosen markets, driving sustained reductions (ultimately to zero) in:
    - fatalities and serious injuries
    - harmful emissions
    - barriers to inclusive mobility
    - unforeseen delays
    - cost inefficiencies

  enabling world-class transport & mobility solutions that underpin the needs of tomorrow's economy & society."

The strategy includes the development of innovative, repeatable propositions based on the Company's world-leading knowledge and expertise, including new, thought-leading areas associated with future transport and mobility.

Thought Leadership

Through the TRL Academy, the Company's in-house research institute, the Company has materially increased its external market engagement and participation in thought-provoking topics. In many instances, the Company is a leading voice in these debates through its deep and long-established credentials as an evidence-based research organisation that provides pragmatic and safe ways to deploy new, innovative thinking for transport and mobility solutions. Today, the Company is strategically investing and delivering projects linked to:

- Connected & autonomous vehicles
- Ultra-low emission vehicles
- Smart cities & urban mobility services
- Intelligent asset infrastructure
- Big data, deep learning and the internet of things.

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Project Director
K.S.T.P., PWD
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By example, the Company has been instrumental in publishing world-leading opinions and papers on autonomous and driverless cars; a research area that the Company has been engaged in starting in the 1950's. This practical experience culminated in the Company securing a leading or strategic role in more than £25m of projects for Connected & Autonomous Vehicles (CAV) during 2015/16. The UK Smart Mobility Living Lab @ Greenwich (www.trl.co.uk/uklivinglab) is an innovative means of undertaking such research in a truly immersive live environment, now already hosting three projects.

In relation to ultra-low emission vehicles, the Company leads some of the latest thinking in their adoption, and secured multiple projects evaluating the implications of electric vehicle usage and their associated charging solutions. These projects range from the practical robustness of static wireless power transfer solutions for charging fully electric buses in eight major cities across Europe – through to researching the implications on consumers of purchasing electric vehicles and the effect on energy supply and how market structures are likely to change.

For smart cities, the Company is increasingly recognising and participating in the growing disruption in how people consume their mobility needs. The traditional purchase of the motor car is being challenged by smart urban solutions – be they highly integrated and efficient public transit solutions, or the increasing popularity of mobility-as-a-service (MAAS) through car-sharing schemes or the introduction of technology-led on-demand services (e.g. the rapid growth of Uber, deployed across almost 500 cities world-wide in just eight years).

In considering tomorrow's transport and mobility infrastructure, it is more than just about capacity and availability, but also having a level of real-time intelligence and connectivity. The Company continues to work on new innovative research into integrated sensor technologies embedded within asset infrastructure, and the evolving needs for intelligent remote condition monitoring and control. This work is increasingly linked to activities in Vehicle to Vehicle (V2V) and Vehicle to Infrastructure (V2I) technological advances being developed in conjunction with major automotive companies and leading global government stakeholders.

Underpinning much of the new thought leadership activities at the Company is the increasing proliferation of information in the form of Big Data, Deep Learning and the Internet of Things (IoT). So much data is being captured by today's transport and mobility solutions, although few services fully leverage the opportunities provided by aggregation of such data, (notwithstanding the implications on data privacy and cyber security). The Company is actively engaged on projects to inform governments and industry on how to navigate this complex area.

UK Market Engagement

As both an internationally designated Research & Technology Organisation (RTO) and a commercial limited-company business, the Company continued its role as an independent research, technology & software organisation in support of its major UK Government clients; these include Highways England, the Department for Transport and Transport for London. The Company plays a key role in providing thought-leading insight and a supporting evidence-base to underpin strategic, operational and policy decisions. Examples of the Company's contributions include:

- Major new programmes into connected and autonomous vehicles, ultra-low emission vehicle technologies and intelligent asset infrastructure, including associated big-data and deep learning initiatives.
- Safety initiatives and investigations, delivering reduced fatalities and serious injuries, covering road, rail, cycling and pedestrian travel modes – for travellers and transport workers in hazardous environments.

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- Independent policy advice relating to air quality, carbon and nitrous oxide emissions – in particular relating to vehicle pollutants from private motor cars and heavy truck supply-chain/logistical operations.
- Research into physical driving disabilities and specific conditions such as diabetes, dementia, head injury and stroke as well as the impact of mental health and cognitive decline - especially in older drivers.
- Reducing congestion and journey times within urban and inter-urban environments using smart, adaptive traffic control technologies and software solutions, linking with new connected-vehicle innovations.
- Optimising investments into asset design, maintenance and operation, while improving the traveller experiences across multiple surface transport operations, especially strategic and local roads.

The Company also delivers valuable services to its private sector client portfolio, especially with leading automotive, motorsport, insurance and energy organisations. Examples of the Company's contributions include:

- Behavioural research helping vehicle manufacturers better understand the ergonomic and cognitive implications of its driver-assist initiatives, with the ever-increasing complexity of in-vehicle technologies.
- Forensic investigations into vehicle incidents involving death or serious injuries, providing insurers with independent expert evidence. This supports liability disputes while identifying preventative interventions.
- Evidence-based assessments into the changing energy demands of society with the uptake and usage of alternative propulsion systems for vehicles, particularly electric vehicles and their charging requirements.
- Research and guidance, including technology roadmaps, considering adoption of connected and autonomous vehicle technologies and associated smart infrastructure standards.

In addition to hosting visits by UK ministers, senior civil servants and senior executives from private sector companies, there were further delegations coming to the Company from around the world, wanting to learn about its expertise and innovative ideas for surface transport; these included delegations from the US, Australia, Germany, Belgium, Qatar and the United Arab Emirates.

International

The Company's international engagement is broad geographically, and diverse in its content. Approximately one third of the Company's income in the period relates to organisations across 145 countries internationally gaining value through the use of the Company's products and services. The international dimension to the Company's business enables it to transfer valuable knowledge and experience to other countries, promoting the excellence of 'UK Plc', while also learning from the cultural, environmental and jurisdictional differences that occur in other countries, enabling the Company to bring that tangible experience to its UK and other international clients.

Participation in major research programmes in Europe continued to be a key focus, with many projects either led by the Company, or where it participated as a core consortia member. The Company continued to influence the European agenda through its direct work on these research programmes, coupled with its membership of relevant European industry bodies that are at the forefront of innovation in surface transport initiatives.

Through its offices in the Middle East (Qatar and United Arab Emirates), the Company continued to build a stronger presence in the region, including work in related countries of Oman and Kuwait. With more employees recruited locally, the Company completed a range of research, consulting and software projects in areas of road safety, vehicle safety, incident investigation, asset maintenance and sustainability, air quality and highway standards.

The Company's focus on Africa continued to provide new opportunities and interesting projects, including Nigeria, Ethiopia, Kenya, Uganda, Zambia and Mozambique. These programmes are typically focused on asset

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maintenance or road safety initiatives, secured through the UK's Department for International Development (DFID), or in region with public sector entities, underpinned by development bank funding organisations.
The Company also continues to support the UN's Decade of Action for Road Safety with a variety of tangible, evidenced initiatives that have reduced deaths and serious injuries in many countries around the world. As part of this important work, the Company won its eighth 'International Road Safety Award', presented by Prince Michael of Kent, Patron of the Commission for Global Road Safety. This award was for its work, in close collaboration with Highways England and their supply chain, into making material improvements to the safety of employees engaged in hazardous working environments on highways during roadside maintenance and upgrades.
The Company's software portfolio continued to grow strongly across its international markets. The traffic software portfolio showed steady growth, supported by new product releases and an increasing number of international installations. In addition, the continued development and deployment of the Company's accident management & investigations software was particularly successful, especially in the Middle East. The portfolio of the Company's asset management software, focused on local and rural road segments, continued to deliver sustained value to clients and create increasing international opportunities for growth.

People

Many of the core competencies of the Company reside in its people. The depth and breadth of the scientific and technical expertise is regularly cited on an international basis by the Company's clients, partners and industry stakeholders.
A critical focus in the period has been the continued emphasis on attracting, retaining and developing the core assets of the Company, its people. Although we have seen an increase in staff turnover in the period, this has remained within industry norms, while the Company continues to redeploy and recruit in line with its growth into new specialist areas determined by its strategic plan.
Substantive investments and personal coaching have been made to deepen the functional disciplines of leadership, business development/commercial, project management and programme delivery; in many cases linked to industry-recognised standards.
The Company's policies and practices towards people have been assessed and accredited under the Investors in People scheme for 15 years. In this 2015/16 period the Company attained Silver standard, achieved by only 6% of accredited organisations. This truly recognises the focus on people and their continuous development and recognition.
A key factor in building the competencies of the Company is the extent to which its people can engage and share knowledge with other industry-leading experts. As such, the Company is represented in international research associations, with examples such as the European Conference of Transport Research Institutes (ECTRI) and the Forum of European Road Safety Research Institutes (FERSI), and the Forum of European National Highway Research Laboratories (FEHRL).
Looking more specifically at its scientific research and technical engineering competencies, the Company uses a framework to drive excellence in this competency, the TRL Academy. In particular, its role in:

- Building strong and truly collaborative relationships with key university departments in order to maximise funding opportunities through partnerships. Activities have included joint projects funded by the UK Research Council, Technology Strategy Board / Innovate UK and the European Commission.
- Managing the Company's programme of re-investment (of its commercial profits) back into developing expertise in its people. This investment is targeted at 'emerging areas' where the Company seeks to develop new, thought-leading areas of innovation for industry.
- Investing in specific people pursuing PhDs at several universities, including the Open University through our OU Affiliated Research Centre status.

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Strategic Report
(Continued)

Overall, the Company recognises that although much of its heritage from its inception in 1933 (while originally part of the UK Government) has involved substantial investments in the creation of sophisticated testing facilities and research laboratories, the Company remains at its heart a knowledge business. Continuously investing in people to build deeper and broader knowledge and expertise, ensuring the Company continues to create the future of transport and mobility, remains the critical focus.

Principal Risks and Uncertainties

There are a range of risks and uncertainties facing the Company. The examples below are not intended to be exhaustive, but comprise the principal risks that the Directors believe could have a significant impact on the Company's performance:

- Macro-Economic Conditions: The Company continues to operate an increasingly diversified portfolio, securing business from a combination of public and private sector clients in the UK, while its international profile of clients in its chosen markets represents circa one third of the Company's income. Despite the success of this diversification, a material downturn in the UK economy could pose a risk to Company performance.
- Framework Contracts: Despite substantial success in diversifying its business in the last few years, the Company is somewhere reliant on certain major UK public sector clients for contracts awarded under framework agreements, which are subject to periodic competitive tender. Given UK Government plans to exit the EU following the UK referendum in June 2016, this is likely to be a challenging market over the next few years. The Company is seeking to better position itself to ensure it is well placed to win future UK public sector contracts, while continuing to diversify into private and international markets.
- Pension Deficit: The Company continues to have a defined benefit pension scheme deficit, details of which are contained within Note 13. The Directors have agreed with the scheme trustees an on-going plan to deal with this deficit. Recent falls in gilt yields, exacerbated by BREXIT, have impacted the pension deficit valuation, although investment returns remained in line with expectations. The Company's strategic plan, already evidencing signs of value creation, seeks to insulate the Company from negative variations to the pension scheme deficit.
- Employees: The Company's continued competitive and reputational success depends on having sufficient employees with appropriate knowledge and expertise. The Company is essentially a knowledge business, with employees as its major asset. There is the risk that if the Company loses, or fails to attract, employees of the requisite calibre, this could adversely impact the business. The Company seeks to mitigate this risk by investing in appropriate professional development, remuneration incentives and focused recruitment.
- BREXIT: The recent outcome of the UK Referendum relating to leaving the EU brings a level of uncertainty. Whilst we do not see the likelihood that the UK will avoid having meaningful knowledge-interchange with the EU in future (and hence opportunities for the Company), there will clearly be a wide-ranging set of changes that markets will need to understand and adapt to.

The Directors maintain a Company risk register that identifies and evaluates risks as soon as possible, while co-ordinating the implementation of suitable measures to mitigate such risks. The risk register is reviewed at least every 3 months, with each identified risk having a 'risk-owner' within the senior leadership team.

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Strategic Report
(Continued)

Outlook

With evidence of an uncertain economic and political climate in the UK (i.e. BREXIT), linked to an increasingly diversified and resilient business, the Company is confident in the foundations it has now set to weather storms that may arise, although it is anticipating some growth in 2016/17. Some of the core investments made in the prior period, including business development capability and product development, will see future benefits relating to incremental new business that underpins this expected growth, subject to market volatility.

Growth will come from the Company's public and private sector clients in the UK, linked with further deepening of its international footprint in growing markets of Middle East, Africa & India. The Company's industry focus will continue to be core surface transport (e.g. strategic & local roads, cities & urban, rail, government policy & standards) sectors, linked with relevant areas of automotive, motorsport, insurance and energy sectors.

The Company remains committed to the value and service quality it delivers to its clients, particularly in new innovative solutions for its chosen markets. Whilst refinement of strategic priorities will continue, competency themes will remain focused on delivering safe, environmentally sound, accessible, reliable and cost effective solutions that create the future of transport and mobility.

The Company will complete a successful integration of its earlier acquisitions of Transport and Travel Research Limited (TTR), plus Appia Infrastructure Solutions Limited (Appia) during 2016/17. The associated legal entities will be subsequently dissolved. Although the Company strategy is firmly focused on organic growth, it will continue to seek incremental, accretive bolt-on acquisitions that create enterprise value.
The Company's newly updated banking arrangements with Lloyds Bank plc, secured in 2014/15, include multi-£m financing facilities that are supplementary to the Company's own cash reserves; these further enable acquisitive investments and ventures to be made, where appropriate.

Rob Wallis
Chief Executive
9 January 2017

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Project Director
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Directors' Report

The Directors present their report and the financial statements for the year ended 30 June 2016. All comparisons below are with the restated figures for the twelve months to 30 June 2015.

Research and Development

As well as performing research projects for its customers, the Company also funds its own programme of innovative research, managed through the TRL Academy, which is mainly delivered internally by the Company's personnel.

Directors of the Company:

The Directors who served during the year were as follows:

R Wallis
P Van Campen appointed 23 July 2015

No director has had any interests in the share capital of the Company or its subsidiaries.

The Board ensures that the Company operates with effective systems and controls. These ensure that both authority and accountability are clearly defined. They also ensure that risks are appropriately managed.
The Company has a Senior Leadership Team. It is this team's responsibility to ensure that the Board has timely, accurate and relevant information to enable it to carry out its responsibilities.

Employees

The average number of employees for the year ended 30 June 2016 was 303 (2015: 316) Full Time Equivalents (FTEs). The actual number of employees decreased during the year, from 316 FTEs at the start of the year to 284 FTEs at the end of the year. This reduction in permanent employees was in some part due to the headcount rationalisation that occurred in the first half of the year while a hiatus in client work was evident, coupled with an increasing use of a flexible supply-chain of stand-by and associate resources to make the core business more efficient and resilient going forwards.

Ratios

Annualised turnover generated per employee for the year ended 30 June 2016 was £111,000, as compared to £106,000 for the period ended 30 June 2015.
The current ratio (current assets as a ratio of current liabilities) as at 30 June 2016 was 1.64, compared to 1.77 at 30 June 2015.

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K.S.T.P., PWD
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Directors' Report
(Continued)

Going Concern

The Company's business activities, together with the factors likely to affect its future development, and the financial position of the Company are set out in the Strategic Report.

The Company uses cash flow forecasts, derived from the budget, and medium-term planning to identify future funding requirements. The Company meets its day to day working capital requirements through operating cash flow, with borrowings in place to fund acquisitions, capital expenditure and bonding requirements. The Transport Research Foundation Group, which includes the Company, had £4.15m (2015: £4.38m) of undrawn committed facilities as at 30 June 2016.

The Company has a pension scheme deficit that, measured under Financial Reporting Standard (FRS) 102, was £18.38m (2015: £16.57m) at the end of June 2016. This liability is due to unwind over a long period of time and scheme payments by the Company are pre-set every three years as part of a triennial funding review.

The Company's forecasts and projections, taking account of reasonable changes in trading performance, confirm that the Company should be able to operate within the level of its banking facility and pension funding commitments for at least 12 months from the date of this report.

After making enquiries and having evaluated the on-going trading of the business, the Directors have reasonable expectations that the Company has adequate resources to continue to operate for a period considered to be at least 12 months from the date of this report. Accordingly, the Directors consider it appropriate to continue to adopt the going concern basis of accounting in preparing the Company's Annual Reports and Financial Statements.

Future Developments

The Company will continue to seek opportunities to develop its new business through diversification into new geographies and services as well as ensure that its existing valuable customer base remains fully satisfied with its current provision of research, technology and software solutions.
In addition, the Directors will continue to look for appropriate acquisitions to add to the Company.

Employees Involvement

The employment policies of the Company embody the principles of equal opportunity and the Company does not discriminate against anyone on any grounds. Employment arrangements are intended to be fair, equitable and consistent with the skills and abilities of the employee and the needs of the business. It is Company policy to comply with all applicable laws governing employment practices and not to discriminate on the basis of any unlawful criteria. The Company ensures that every consideration is given to applications of employment from disabled persons. If an employee becomes disabled, every effort would be made to offer suitable alternative employment within the Company and assistance in training.

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Project Director
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The Company operates a framework for employee information and consultation which complies with the requirements of the Information and Consultation of Employees and Regulations 2004. The Company keeps employees informed via the Company's SharePoint intranet site and by periodic "Town Hall" meetings and internal announcements, and takes account of any comments and feedback provided directly by employees, or through the Employee Council, in the formulation of its policies and procedures.

The Board would like to thank all employees of the Company for the valuable contribution that they made during the year.

Environmental Policy

The Company is committed, by means of target setting, monitoring and periodic audits, to ensure that environmental issues are considered in planning our business and managing our operations and to comply with the requirements of environmental legislation, regulations and codes of practice.

The Company will minimise pollution, reduce waste, reduce the consumption of natural resources, and promote recycling and re-use and assist contractors, suppliers and clients to develop a similar approach to protection of the environment. It will also promote green travel, seek to continually improve its environmental performance and provide the necessary training and support to its staff to ensure that they are able to fulfil these commitments.

Certifications

The Company is currently certified to the following standards:

- ISO 9001:2008 – Quality Management System Requirements
- ISO 14001:2004 – Environmental Management System
- OHSAS 18001:2007 – Health & Safety Management System
- ISO 27001:2013 – Specification for Information Security
- ISO/IEC 17025 – Testing Laboratory Management System Requirements

In addition to its formal certifications, the Company's Anti-Bribery policy and procedures have been designed in accordance with the principles of BS 10500 (Anti-Bribery Management System) and the Business Continuity Management plan has been implemented in accordance with the requirements of BS 22301:2012 (Business Continuity Management).

Directors' and Officers' Liability Insurance

During the year the Company purchased and maintained liability insurance for its Directors and officers as permitted by section 234 of the Companies Act 2006.

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Project Director
K.S.T.P., PWD
Trivandrum

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Directors' Report
(Continued)

Disclosure of Information to Auditor

The Directors who held office at the date of approval of this Directors' Report confirm that, so far as they are each aware, there is no relevant audit information of which the Company's auditor is unaware and each Director has taken all steps that they ought to have taken as a Director to make them aware of any relevant audit information and to establish that the Company's auditor is aware of that information.

Director's Responsibility Statement

The Directors are responsible for preparing the Strategic report, Directors' Report and the Company financial statements each financial year in accordance with applicable law and regulations. Company law requires the Directors to prepare Company financial statements for each financial year. Under that law they are required to prepare the Company financial statements in accordance with FRS 102.

Under company law, the Directors must not approve the financial statements unless they are satisfied that they give a true and fair view of the state of affairs of the Company and of their profit or loss for that period. In preparing each of the Company financial statements, the Directors are required to:

- Select suitable accounting policies and then apply them consistently;
- Make adjustments and estimates that are reasonable and prudent;
- State whether they have been prepared in accordance with FRS 102;
- Prepare the financial statements on the ongoing basis unless it is inappropriate to presume that the Company will continue in business.

The Directors are responsible for keeping adequate accounting records that are sufficient to show and explain the Company's transactions and disclose with reasonable accuracy at any time the financial position of the Company and enable them to ensure that its financial statements comply with the Companies Act 2006. They have general responsibility for taking such steps as are reasonably open to them to safeguard the assets of the Company and to prevent and detect fraud and other irregularities.

Rob Wallis
Chief Executive
9 January 2017

Peter Van Campen
Finance Director
9 January 2017

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Project Director
K.S.T.P., PWD
Trivandrum

Independent Auditor's Report

To the Members of TRL Limited

Independent auditor's report

We have audited the financial statements of TRL Limited for the year ended 30 June 2016 which comprise the Income Statement, the Statement of Comprehensive Income, the Statement of Changes in Equity, the Statement of Financial Position and the related notes 1 to 20. The financial reporting framework that has been applied in their preparation is applicable law and United Kingdom Accounting Standards (United Kingdom Generally Accepted Accounting Principles, including FRS 102).

This report is made solely to the company's members, as a body, in accordance with Chapter 3 of Part 16 of the Companies Act 2006. Our audit work has been undertaken so that we might state to the company's members those matters we are required to state to them in an auditor's report and for no other purpose. To the fullest extent permitted by law, we do not accept or assume responsibility to anyone other than the company and the company's members as a body, for our audit work, for this report, or for the opinions we have formed.

Respective responsibilities of Directors and auditors

As explained more fully in the Directors' Responsibilities Statement (set out on page 13), the Directors are responsible for the preparation of the financial statements and for being satisfied that they give a true and fair view. Our responsibility is to audit and express an opinion on the financial statements in accordance with applicable law and International Standards on Auditing (UK and Ireland). Those standards require us to comply with the Auditing Practices Board's Ethical Standards for Auditors.

Scope of the audit of the financial statements

An audit involves obtaining evidence about the amounts and disclosures in the financial statements sufficient to give reasonable assurance that the financial statements are free from material misstatement, whether caused by fraud or error. This includes an assessment of: whether the accounting policies are appropriate to the company's circumstances and have been consistently applied and adequately disclosed; the reasonableness of significant accounting estimates made by the Directors; and the overall presentation of the financial statements. In addition, we read all the financial and non-financial information in the Report and Financial Statements to identify material inconsistencies with the audited financial statements. If we become aware of any apparent material misstatements or inconsistencies we consider the implications for our report.

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

000389

Independent Auditor's Report

To the Members of TRL Limited
(Continued)

Opinion on financial statements

In our opinion the financial statements:

- give a true and fair view of the state of the company's affairs as at 30 June 2016 and of the company's loss for the year then ended;
- have been properly prepared in accordance with United Kingdom Generally Accepted Accounting Practice; and
- have been prepared in accordance with the requirements of the Companies Act 2006.

Opinion on other matter prescribed by the Companies Act 2006

In our opinion the information given in the Strategic Report and the Directors' Report for the financial year for which the financial statements are prepared is consistent with the financial statements.

Matters on which we are required to report by exception

We have nothing to report in respect of the following matters where the Companies Act 2006 requires us to report to you if, in our opinion:

- adequate accounting records have not been kept, or returns adequate for our audit have not been received from branches not visited by us; or
- the parent company financial statements are not in agreement with the accounting records and returns; or
- certain disclosures of Directors' remuneration specified by law are not made; or
- we have not received all the information and explanations we require for our audit.

Ernst + Young LLP
Kevin Harkin (Senior statutory auditor)
for and on behalf of Ernst & Young LLP, Statutory Auditor
Reading
9 January 2017

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

Annexure B – Experion's Supporting Information [Financials]

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

000341

EXPERION TECHNOLOGIES (INDIA) PRIVATE LIMITED
CIN: U72200KL2006PTC019336
407, 4th Floor, Thejaswini Building Technopark Campus, Kazhakuttom, Trivandrum - 695 581

Statement of Profit and Loss for the year ended 31st March, 2019

	Particulars	Notes	Figures for the Current Reporting Period (₹)	Figures for the Previous Reporting Period (₹)
I	Revenue from Operations	1.19	45,54,08,672	31,80,80,342
II	Other Income	1.20	37,42,707	30,34,112
III	**Total Revenue (I + II)**		45,91,51,379	32,11,14,454
IV	**Expenses**			
	Employee Benefits Expenses	1.21	31,43,73,210	23,19,14,111
	Finance Costs	1.22	57,64,278	44,04,663
	Depreciation and Amortization Expenses	1.23	1,15,50,805	1,13,69,816
	Other Expenses	1.24	11,55,76,289	6,82,92,066
	Total Expenses		44,72,64,582	31,59,80,656
V	**Profit before Exceptional & Extra ordinary Items and Tax (III - IV)**		**1,18,86,797**	**51,33,798**
VI	Exceptional Items			
VII	**Profit before Extra ordinary Items and Tax (V - VI)**		**1,18,86,797**	**51,33,798**
VIII	Extra Ordinary Items			
IX	**Profit before Tax**		**1,18,86,797**	**51,33,798**
X	Tax Expenses			
	(1) Current Tax		25,50,121	25,00,000
	(2) Deferred Tax		46,88,022	-3,66,848
	(3) MAT Credit Entitlement		-24,47,112	
XI	**Profit for the period from continuing operations**		**70,95,766**	**30,00,647**
XII	Profit / (Loss) from discontinuing operations			
XIII	Tax Expenses of discontinuing operations			
XIV	Profit / (Loss) from discontinuing operations (after tax)(XII - XIII)			
XV	**Profit for the period (XI + XIV)**		70,95,766	30,00,647
XVI	Earnings per Equity Share			
	(1) Basic		1.83	0.77
	(2) Diluted		1.83	0.77

Significant accounting policies and notes forming part of accounts

AUDITOR'S REPORT
Vide our report of even date attached

For Ranjit Karthikeyan Associates
Chartered Accountants
Firm Registration No 006705S

02.09.2019

CA M R Ranjit Karthikeyan B.Com FCA
Partner (Mem No: 201680)
UDIN: 19201680AAAAAH4034

By the order of the Board

Binu Jacob
Managing Director
DIN: 02206337

Suresh V P
Director
DIN:03083375

Place : Trivandrum
Date : 31.08.2019

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

000342

Project Director
K.S.T.P., PWD
Trivandrum

EXPERION TECHNOLOGIES (INDIA) PRIVATE LIMITED

407, 4th Floor, Thejaswini Building Technopark Campus, Kazhakuttom, Trivandrum - 695 581

Statement of Profit and Loss for the year ended 31st March, 2018

(Amount in Rs.)

	Particulars	Notes	Figures for the Current Reporting Period	Figures for the Previous Reporting Period
I	Revenue from Operations	1.19	31,80,80,342.27	28,23,43,742.95
II	Other Income	1.20	30,34,111.94	8,86,932.69
III	**Total Revenue (I + II)**		**32,11,14,454.21**	**28,32,30,675.64**
IV	**Expenses**			
	Employee Benefits Expenses	1.21	23,19,14,110.96	19,17,34,646.09
	Finance Costs	1.22	44,04,663.03	40,72,817.65
	Depreciation and Amortization Expenses	1.23	1,13,69,816.23	2,25,76,865.98
	Other Expenses	1.24	6,82,92,065.62	5,95,57,918.52
	Total Expenses		**31,59,80,655.84**	**27,79,42,248.24**
V	**Profit before Exceptional & Extra ordinary Items and Tax (III - IV)**		**51,33,798.37**	**52,88,427.40**
VI	Exceptional Items			
VII	**Profit before Extra ordinary Items and Tax (III - IV)**		51,33,798.37	52,88,427.40
VIII	Extra Ordinary Items			
IX	**Profit before Tax**		51,33,798.37	52,88,427.40
X	Tax Expenses			
	(1) Current Tax		25,00,000.00	41,46,305.00
	(2) Deferred Tax		(3,66,848.34)	(25,50,404.59)
	(3) MAT Credit Entitlement			
XI	**Profit for the period from continuing operations**		30,00,646.71	36,92,526.99
XII	Profit / (Loss) from discontinuing operations			
XIII	Tax Expenses of discontinuing operations			
XIV	Profit / (Loss) from discontinuing operations (after tax) (XII - XIII)			
XV	**Profit for the period (XI + XIV)**		**30,00,646.71**	**36,92,526.99**
XVI	Earnings per Equity Share			
	(1) Basic		0.77	0.95
	(2) Diluted		0.77	0.95

Significant accounting policies and notes forming part of accounts

AUDITOR'S REPORT
Vide our report of even date attached

By the order of the Board

For Ranjit Karthikeyan Associates
Chartered Accountants
Firm Registration No ; 006705 S

Binu Jacob
Managing Director

Suresh V P
Director

CA. M R Ranjit Karthikeyan B Com FCA
Partner (Mem # 201680)

Place : Trivandrum
Date :31.08.2018

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

EXPERION TECHNOLOGIES (INDIA) PRIVATE LIMITED

407, 4th Floor, Thejaswini Building Technopark Campus, Kazhakuttom, Trivandrum - 695 581

Statement of Profit and Loss for the year ended 31st March, 2017

	Particulars	Notes	(Amount in INR) Figures for the Current Reporting Period	(Amount in INR) Figures for the Previous Reporting Period
I	Revenue from Operations	1.19	28,23,43,742.95	19,09,45,150.23
II	Other Income	1.20	8,86,932.69	13,98,073.44
III	**Total Revenue (I + II)**		**28,32,30,675.64**	**19,23,43,223.67**
IV	**Expenses**			
	Employee Benefits Expenses	1.21	19,17,34,646.09	13,66,79,149.11
	Finance Costs	1.22	40,72,817.65	30,38,636.00
	Depreciation and Amortization Expenses	1.23	2,25,76,865.98	1,14,57,675.44
	Other Expenses	1.24	5,95,57,918.52	3,79,37,605.15
	Total Expenses		**27,79,42,248.24**	**18,91,13,065.70**
V	**Profit before Exceptional & Extra ordinary Items and Tax (III - IV)**		**52,88,427.40**	**32,30,157.97**
VI	Exceptional Items		-	-
VII	**Profit before Extra ordinary Items and Tax (III - IV)**		52,88,427.40	32,30,157.97
VIII	Extra Ordinary Items		-	-
IX	**Profit before Tax**		52,88,427.40	32,30,157.97
X	Tax Expenses			
	(1) Current Tax		41,46,305.00	30,43,350.00
	(2) Deferred Tax		(25,50,404.59)	(17,73,612.53)
	(3) MAT Credit Entitlement		-	-
XI	**Profit for the period from continuing operations**		36,92,526.99	19,60,420.50
XII	Profit / (Loss) from discontinuing operations		-	-
XIII	Tax Expenses of discontinuing operations		-	-
XIV	Profit / (Loss) from discontinuing operations (after tax)(XII - XIII)		-	-
XV	**Profit for the period (XI + XIV)**		**36,92,526.99**	**19,60,420.50**
XVI	Earnings per Equity Share			
	(1) Basic		0.95	0.51
	(2) Diluted		0.95	0.51

Significant accounting policies and notes forming part of accounts

AUDITOR'S REPORT
Vide our report of even date attached

For Ranjit Karthikeyan Associates
Chartered Accountants
Firm Registration No ; 006705 S

By the order of the Board

Binu Jacob
Managing Director

Suresh V P
Director

CA. M R Ranjit Karthikeyan B.Com FCA
Partner (Mem # 201680)

Place : Trivandrum
Date :31.08.2017

TRL PROFESSIONAL SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

EXPERION TECHNOLOGIES (INDIA) PRIVATE LIMITED

407, 4th Floor, Thejaswini Building Technopark Campus, Kazhakuttom, Trivandrum - 695 581

Statement of Profit and Loss for the year ended 31st March, 2016

(Amount in INR)

	Particulars	Notes	Figures for the Current Reporting Period	Figures for the Previous Reporting Period
I	Revenue from Operations	1.19	19,09,45,150.23	12,91,93,467.04
II	Other Income	1.20	13,98,073.44	11,26,400.67
III	**Total Revenue (I + II)**		**19,23,43,223.67**	**13,03,19,867.71**
IV	**Expenses**			
	Employee Benefits Expenses	1.21	13,66,79,149.11	8,72,62,137.50
	Finance Costs	1.22	30,38,636.00	21,55,402.00
	Depreciation and Amortization Expenses	1.23	1,14,57,675.44	96,93,556.00
	Other Expenses	1.24	3,79,37,605.15	2,87,66,471.70
	Total Expenses		**18,91,13,065.70**	**12,78,77,567.20**
V	**Profit before Exceptional & Extra ordinary Items and Tax (III - IV)**		**32,30,157.97**	**24,42,300.51**
VI	Exceptional Items			
VII	**Profit before Extra ordinary Items and Tax (III - IV)**		32,30,157.97	24,42,300.51
VIII	Extra Ordinary Items			
IX	Profit before Tax		32,30,157.97	24,42,300.51
X	Tax Expenses			
	(1) Current Tax		30,43,350.00	11,45,000.00
	(2) Deferred Tax		(17,73,612.52)	1,02,035.82
	(3) MAT Credit Entitlement			
XI	**Profit for the period from continuing operations**		19,60,420.50	11,95,264.69
XII	Profit / (Loss) from discontinuing operations		-	-
XIII	Tax Expenses of discontinuing operations		-	-
XIV	Profit / (Loss) from discontinuing operations (after tax)(XII - XIII)		-	-
XV	**Profit for the period (XI + XIV)**		19,60,420.50	11,95,264.69
XVI	Earnings per Equity Share			
	(1) Basic		0.51	0.31
	(2) Diluted		0.51	0.31

Significant accounting policies and notes forming part of accounts

AUDITOR'S REPORT

Vide our report of even date attached

For Ranjit Karthikeyan Associates

Chartered Accountants

Firm Registration No ; 006705 S

CA. M R Ranjit Karthikeyan B.Com FCA

Partner (Mem # 201680)

By the order of the Board

Binu Jacob

Managing Director

Suresh V P

Director

Place : Trivandrum

Date : 26.08.2016

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

000345

Project Director
K.S.T.P., PWD
Trivandrum

TRL

SERVICES (INDIA) LLP

000346

Project Director
K.S.T.P., PWD
Trivandrum

experion

TRL THE FUTURE OF TRANSPORT

PROPOSAL

SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF A WEB BASED SOFTWARE SYSTEM FOR ROAD MAINTENANCE MANAGEMENT FOR THE KERALA PUBLIC WORKS DEPARTMENT

ATTACHMENT 3 – ELIGIBILITY OF GOODS & SERVICES

CLIENT

KERALA STATE TRANSPORT PROJECT
PUBLIC WORKS DEPARTMENT
GOVERNMENT OF KERALA

TRL FI[illegible]E SERVICES (INDIA) LLP

000347

Project Director
K.S.T.P., PWD
Trivandrum

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TRL [illegible] SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

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3 Attachment 3 – Eligibility of Goods & Services

N/A

SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

experion technologies

TRL THE FUTURE OF TRANSPORT

PROPOSAL

SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF A WEB BASED SOFTWARE SYSTEM FOR ROAD MAINTENANCE MANAGEMENT FOR THE KERALA PUBLIC WORKS DEPARTMENT

ATTACHMENT 4 – CONFORMITY OF THE INFORMATION SYSTEM TO THE BIDDING DOCUMENTS

CLIENT

KERALA STATE TRANSPORT PROJECT
PUBLIC WORKS DEPARTMENT
GOVERNMENT OF KERALA

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

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Project Director
K.S.T.P., PWD
Trivandrum

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Project Director
K.S.T.P., PWD
Trivandrum

4 Attachment 4 – Conformity of the Information System to the Bidding Documents

KEY POINTS

- The iROADS system is compliant with the technical and functional requirements specified in 'Section VI Technical Requirements' of the RFP.
- The iROADS system is developed using 100% open source technologies and tools. Hence, there is no ongoing additional license cost for the client.

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Project Director
K.S.T.P., PWD
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4.1 Description of Information Technologies, Materials, Other Goods, and Services

iROADS from TRL is a GIS-based custom off the shelf asset management system which was widely used across the Globe. The current version of the iROADS application, which complies with all the functional requirements specified in the functional requirements section of the Request for Proposal (RFP) document, can be implemented in a client/server architecture, allowing the clients/customers to access the application using the standard web browsers. As a part of the product roadmap of iROADS, TRL has progressed quite well into the re-engineering of the application into the latest web based technologies as outlined in 'Section 4.1.3 - Technical Architecture of the system' of this report. For this particular project, the latest version of the iROADS application will be provided.

4.1.1 Road Asset Management System 'iROADS' from TRL

iROADS is a GIS-based custom off the shelf asset management system fully developed within TRL that can be adapted, customised and further developed to meet customer specific requirements. iROADS provides a comprehensive system for road owners, operators and authorities to manage all their road assets in a single system. With inbuilt mapping, comprehensive analyses for maintenance programmes, deterioration modelling, whole life costing and lifecycle analysis, and extensive reporting functionality it is configurable for all types of assets from modern design highways.

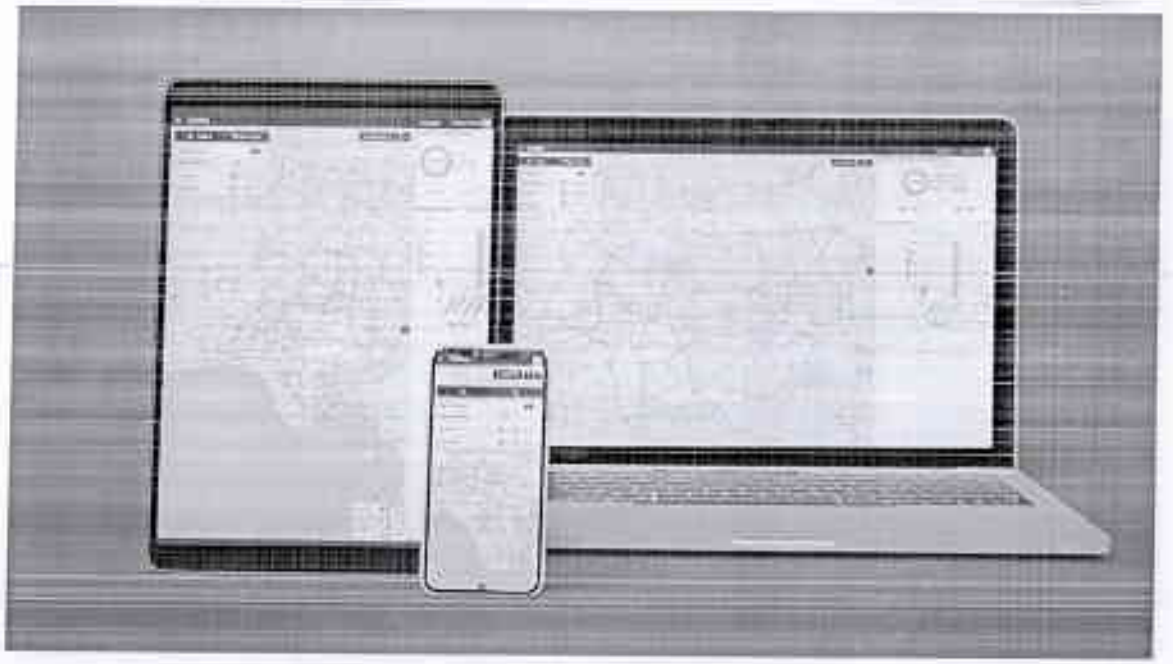


Figure 4-1 iROADS Web, Mobile and Tablet view

iROADS meets a wide range of requirements for asset management for virtually all roads, roads owners and operators. Having partnered with local and national roads authorities,

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Project Director
K.S.T.P., PWD
Trivandrum

owners and operators across the globe, TRL has identified most of the needs and requirements for a full asset management system implementation that meets our client's business, political and user perception needs for optimising the management and maintaining all their highway network assets to high standard levels.

- Fully web-based: easy integration with other external systems through our RESTful API Services.
- Integrated mobile applications which support online/offline data collection. Works on standard devices running Android and iOS software
- Advanced and flexible in-built reporting tools – Standard Reports, Flexible user defined reporting
- Analyse and develop forward work programs for different assets (e.g. Roads, Footpaths)

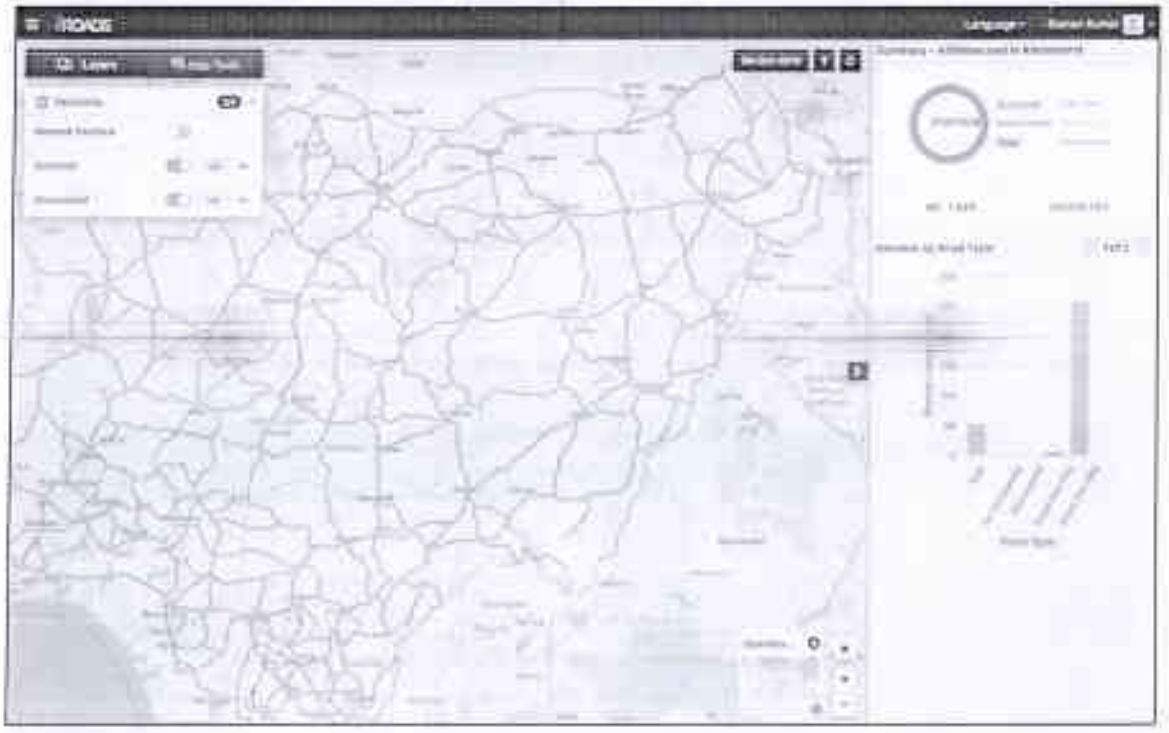


Figure 4-2 iROADS Application Home Page

The iROADS package has been developed to provide the flexibility so that it can be extensively configured by the user, to consider future changes in the way the network is operated. New asset data such as condition information, deterioration relationships and improved prioritisation algorithms can be created and uploaded when they become available.

The whole set of iROADS tools were designed with integration and modularity in mind, and many of the features can easily be configured by the users. For example, within every

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Project Director
K.S.T.P., PWD
Trivandrum
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module and at any stage, iROADS can store different documents and formats (pictures, video, PDFs, etc.) attached against each inventory item.

The screenshot below shows the camera image collected and stored in the system as part of a routine survey work.



iROADS Video Survey & Attachment Viewer

iROADS integrates a standard GIS interface with multiple sources of online maps and the ability to display external shape files.

iROADS has an easy to use interface for the current GIS tools and asset specific components, fully compatible with the Open source GIS tools such as Open Layers. The GIS will provide Standard GIS operations, Standard Thematic Operations selected by the user or from pre-defined maps, Standard Maps for data and analysis results from each of the asset components of the system (with the ability to display each lane). The analysis results can be displayed on the GIS interface with relevant legends and units.

iROADS currently provides secure access (via user login and password) to parts of the system for different types of users. The classes of users, levels of access and security will be agreed with the client. A record of current and past users and their levels of security and data access will be stored centrally.

We will draw on the experience we have gained in the development and implementation of large scale network level Road Asset Management Systems for international clients, and some key points that enhance the capability of iROADS include:

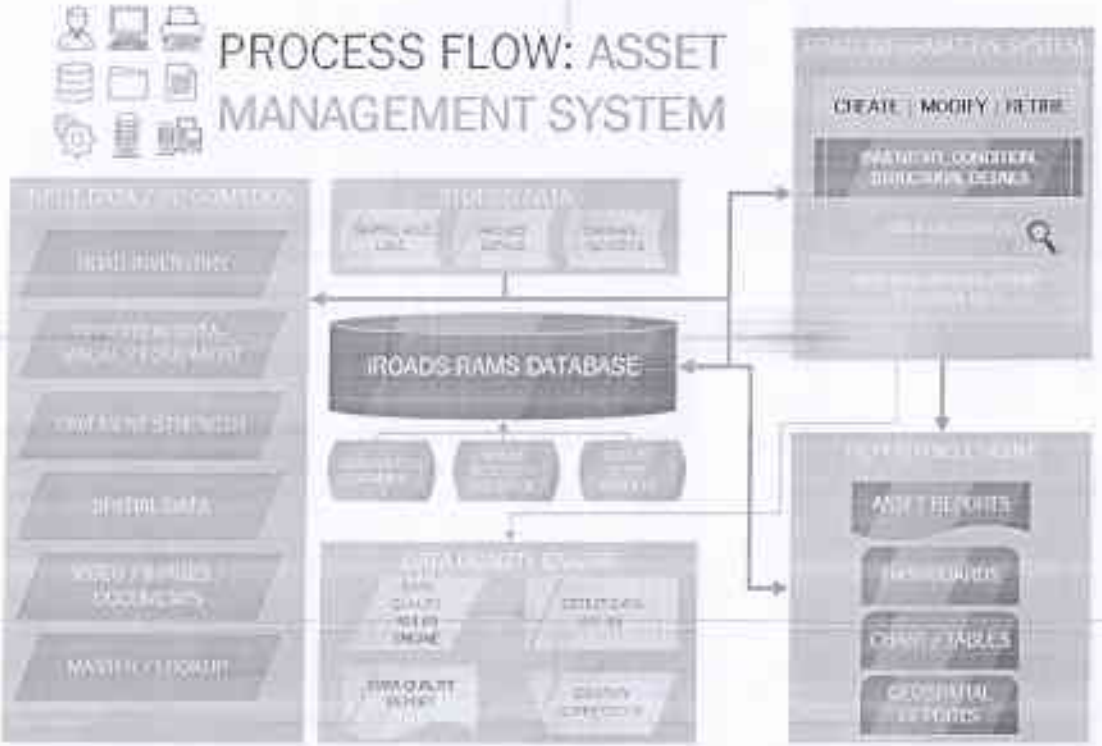
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Project Director
K.S.T.P., PWD
Trivandrum

- iROADS was designed to be highly configurable to meet the different needs of international infrastructure managers and to consider future changes in the way the network is operated.
- Whilst the system is effectively "off the shelf" it can be tuned to meet specific client needs and does not have the restrictions in flexibility suffered by some systems.

The RIS & RMMS can be implemented for KSTP through configuration, installation and hosting of iROADS. This will consist of the components described in the sections below, which align with the requirements of KSTP from the technical specifications. The diagram given below depicts the overall components of the iROADS RIS & RMMS and the process flows.

Figure 4-3 Process Flow – Asset Management System



4.1.1.1 Road Information System (RIS)

iROADS has the ability to store inventory and condition data regarding other assets such as signs, road markings, street lighting, safety barriers, urban furniture, as well as other linear or discrete asset types.

The Road Information System (RIS) of the iROADS allows for the upload and storage of inventory data (with user defined attributes for each element as well as other information

TRL PROFESSIONAL & SOFTWARE SERVICES

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Project Director
K.S.T.P., PWD
Trivandrum

records such as images or PDF documents) and condition data captured through planned, routine and/or unplanned inspection records.

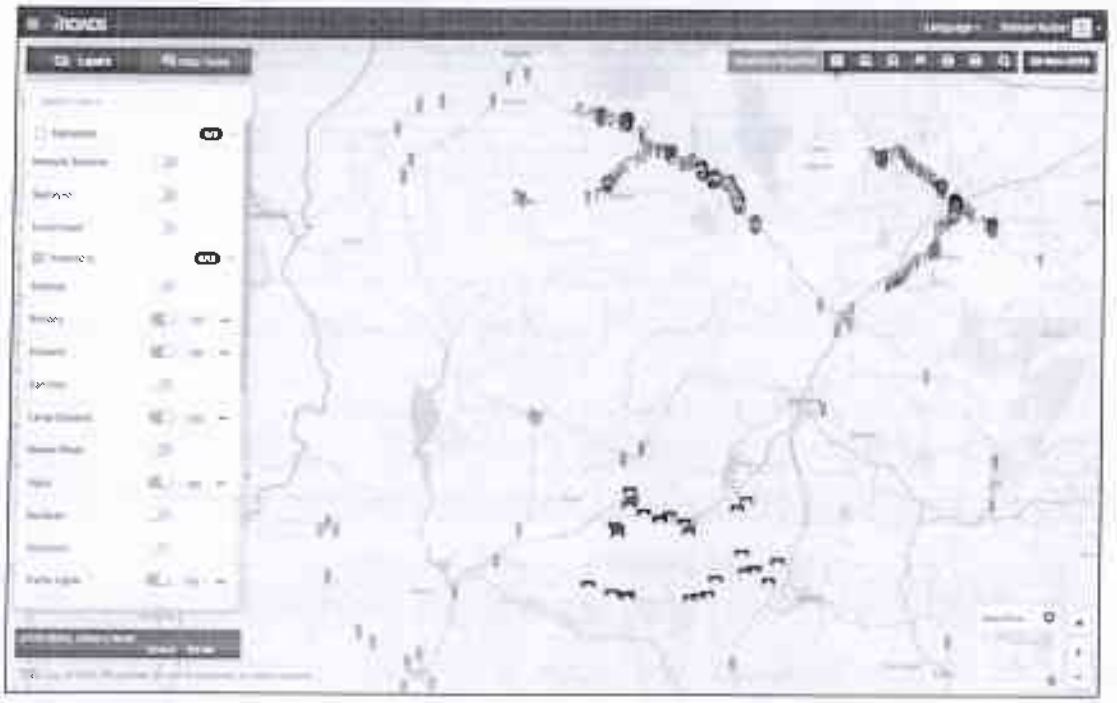


Figure 4-4 iROADS Asset Register

iROADS will be further customised to allow for simple deterioration relationships to be configured for each asset type, and rules defined for the prioritisation of maintenance treatments or renewals based on client specific requirements at KSTP.

The Road Information System can also be configured to incorporate unit rates for maintenance, renewal activities and calculate lifecycle costs for each maintenance strategy.

A wide ranging and flexible capability for reporting is available in iROADS to support decision making processes. The reports cover all aspects of data and asset analysis results expected from the Road Information System.

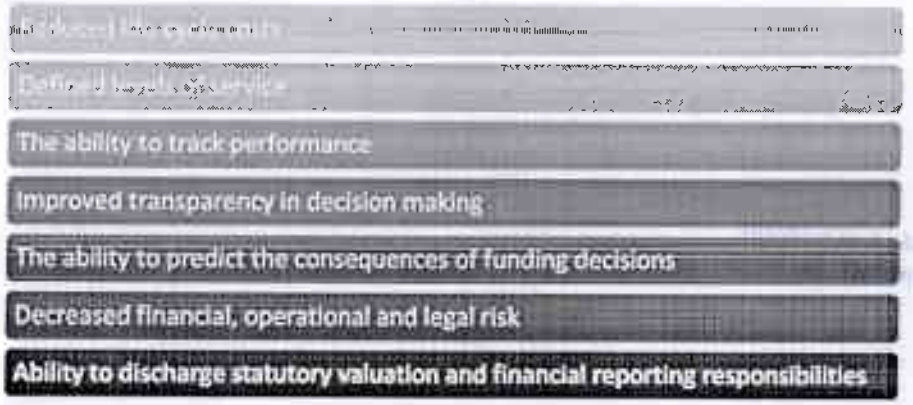


Figure 4-5: Business benefits of iROADS

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Project Director
K.S.T.P., PWD
Trivandrum
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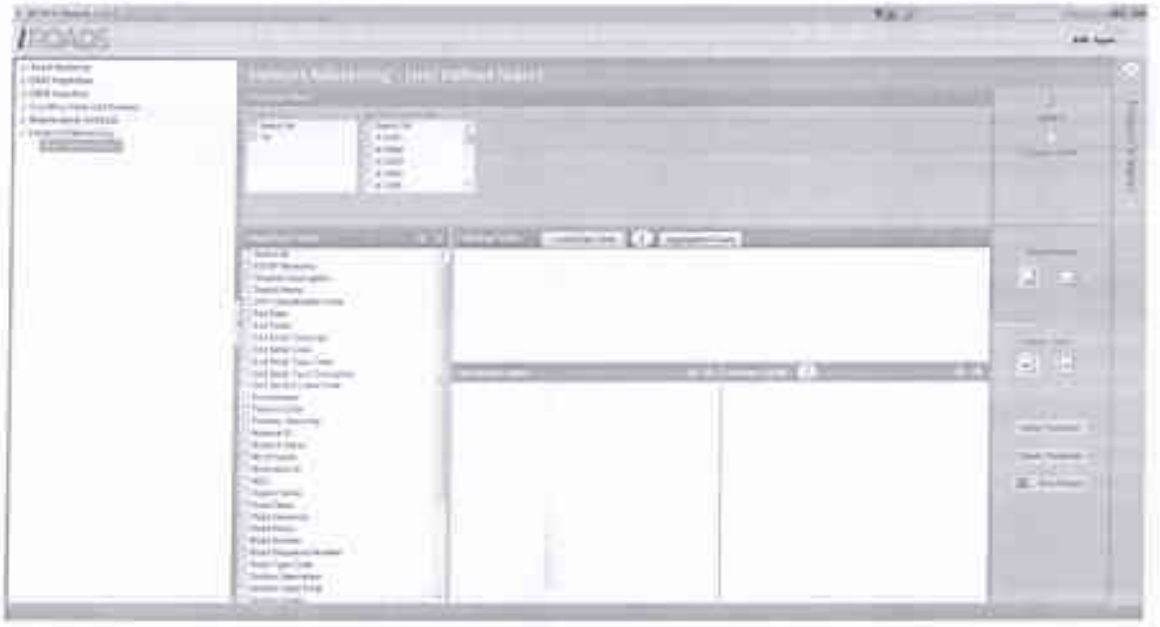


Figure 4-6 : iROADS - Report Generator

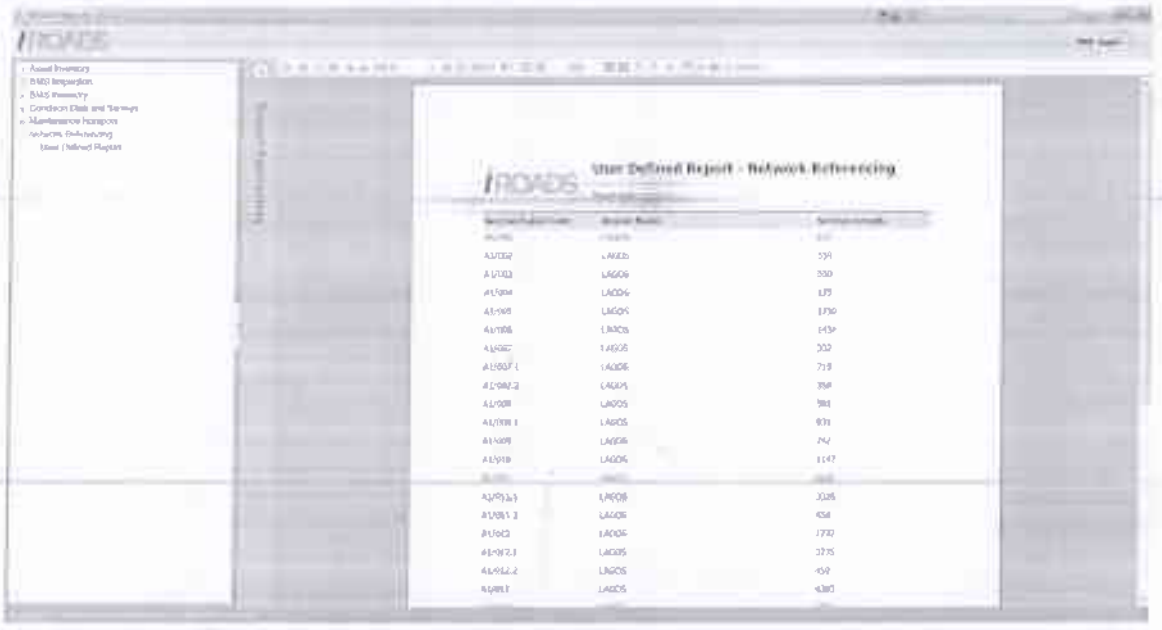


Figure 4-7 : iROADS - User Defined Reports

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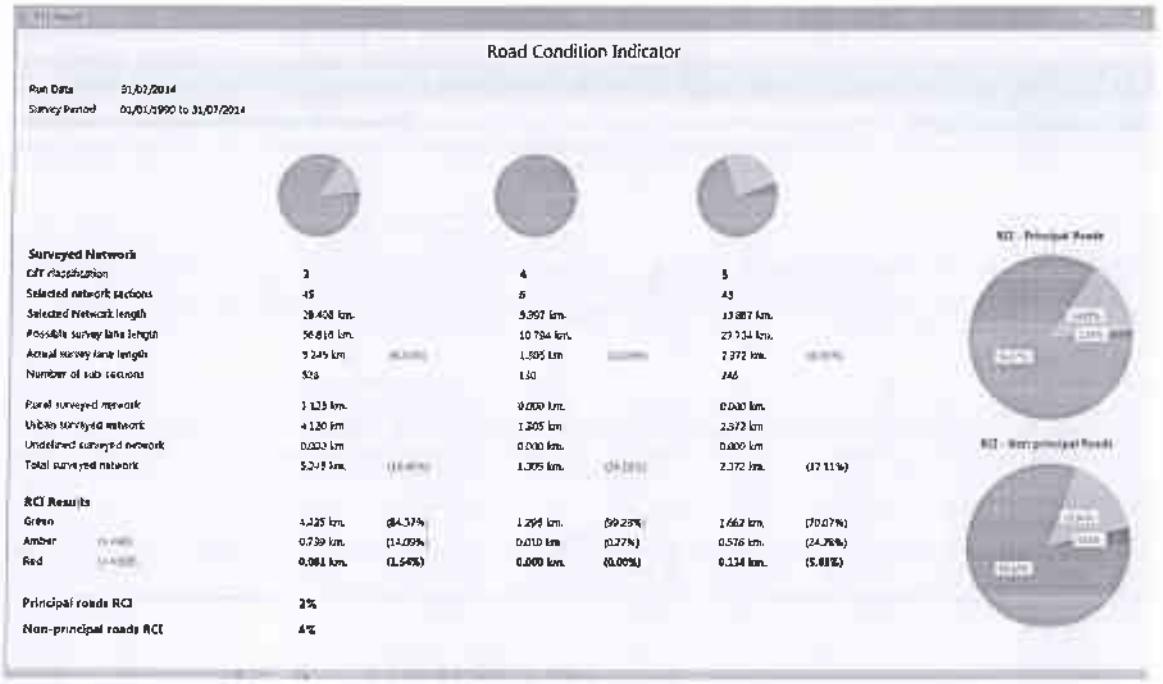


Figure 4-8 : iROADS - RCI Report

The system allows the user to query the data and interrogate the data in a drill down approach. The results can be accessed on the GIS interface, tabular format and as a graphical representation.



Figure 4-9 : Query/Drilldown using the GIS Interface

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Figure 4-10 : Query/Drilldown using Advanced Attribute Search

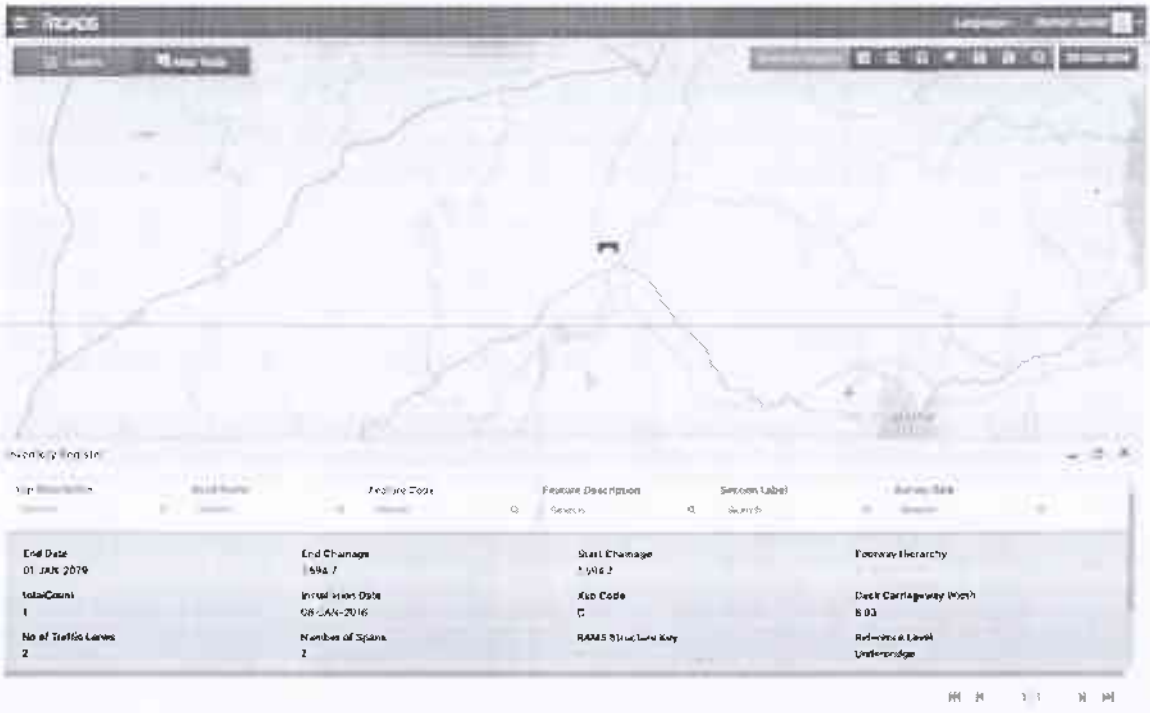


Figure 4-11 : View details by drilldown to the next level

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4.1.1.2 *Traffic Information System (TIS)*

iROADS has a Traffic Toolkit built into it, which will provide the functionality expected out of the Traffic Information System (TIS) component of the iROADS. The process flows involved in the Traffic Information System Component of iROADS is shown below.

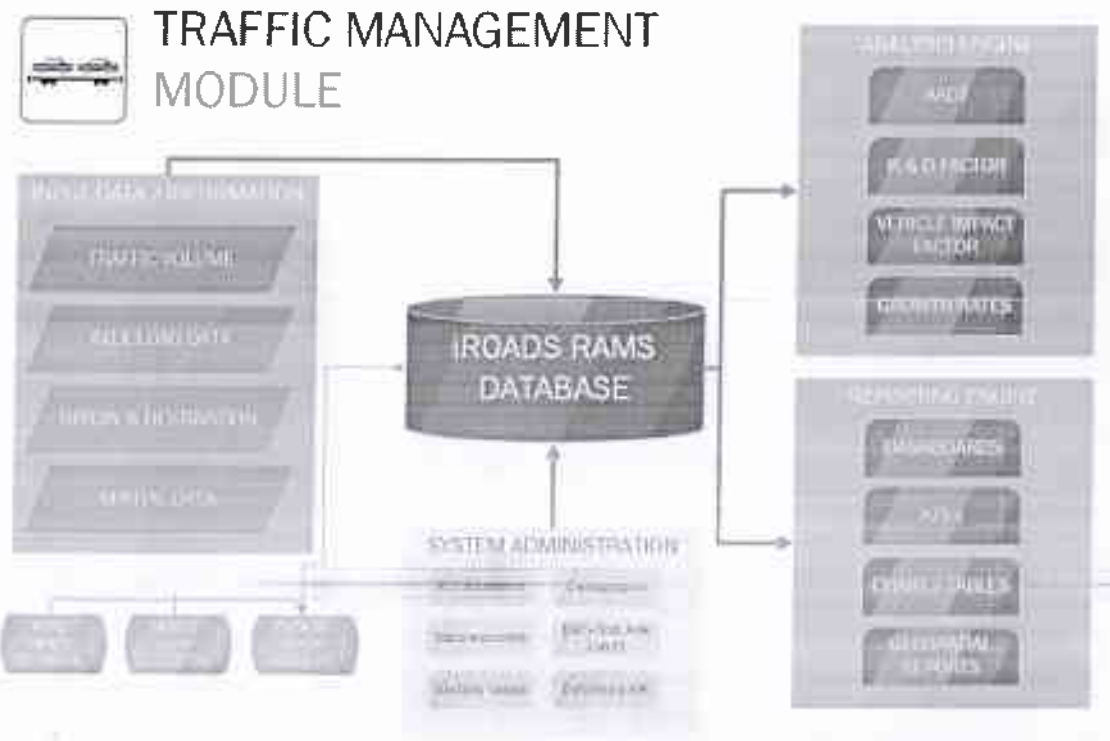


Figure 4-12 : Process Flow - Traffic Management Module

The Traffic Toolkit in iROADS allows the import, processing and display of traffic data, primarily traffic count data (but also axle load data) for use throughout iROADS. The Traffic Toolkit provides a bespoke home for detailed traffic data to be stored.

The screenshot below shows the location of the traffic count stations along with the traffic volume data uploaded.

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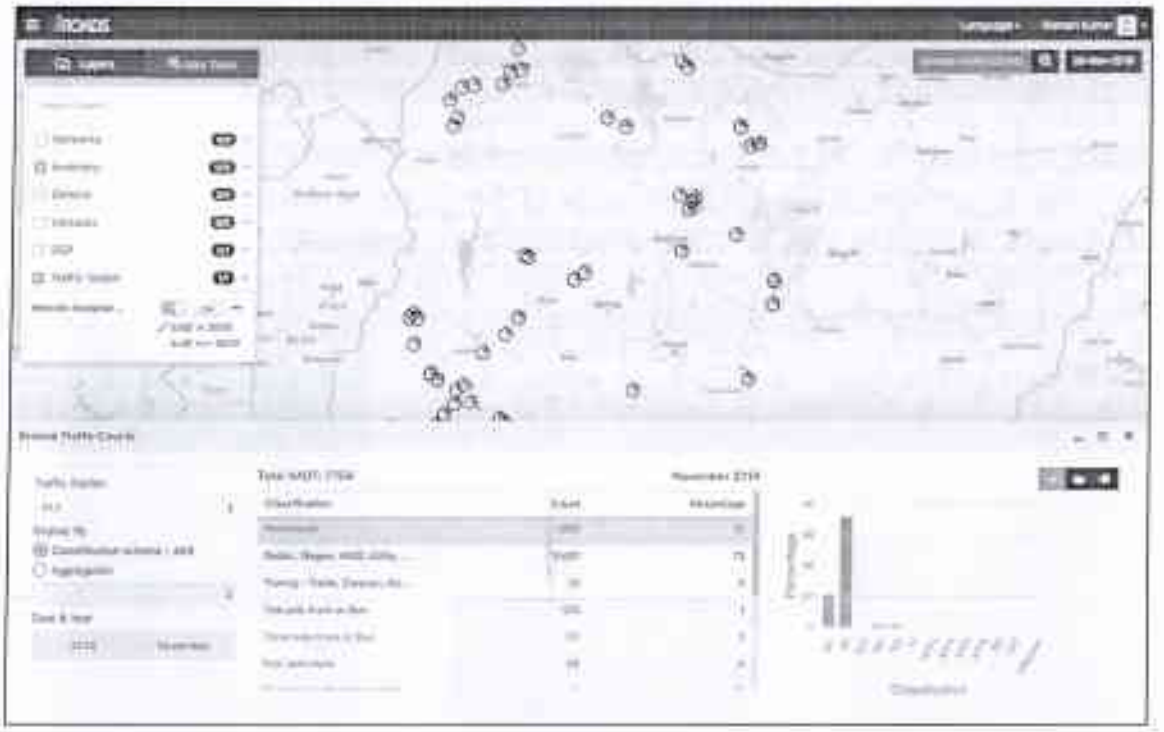


Figure 4-13 : iROADS - Traffic Toolkit

Functionality in the TIS is:

- Loading traffic and WIM data
- Setting up vehicle classifications and aggregations, and applying growth rates to those groups
- Viewing and interrogating daily count data
- Assigning traffic count data across the whole network
- Visual display of traffic data on the GIS

The system uses a pre-defined logic to assign traffic count data across the whole network. The screenshot below shows the system assigned traffic count data on the GIS interface.

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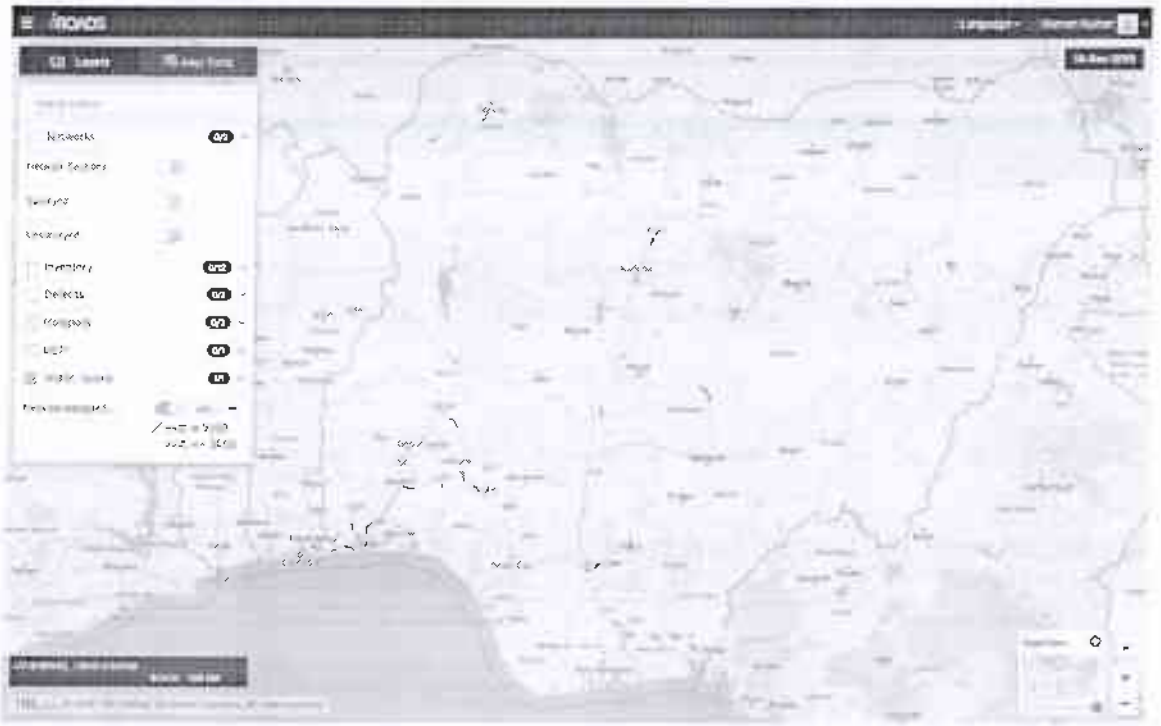


Figure 4-14 : iROADS – Traffic Count Data Assignment

4.1.1.3 Pavement Management System (PMS)

iROADS will provide the pavement management capability component to enable KSTP to store pavement data and undertake strategic as well as tactical level analyses of maintenance policies for the KSTP network.

The Pavement Management System (PMS) component of iROADS is capable of importing, storing and using pavement inventory and condition data, taken from multiple surveys over multiple years. The condition data can be imported to the system using standard HMDIF format or similar formats, using a pre-defined CSV template. The screenshot below shows the condition data uploaded in on the GIS interface of the system.



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The screenshot below shows the condition data uploaded in on the GIS interface of the system.

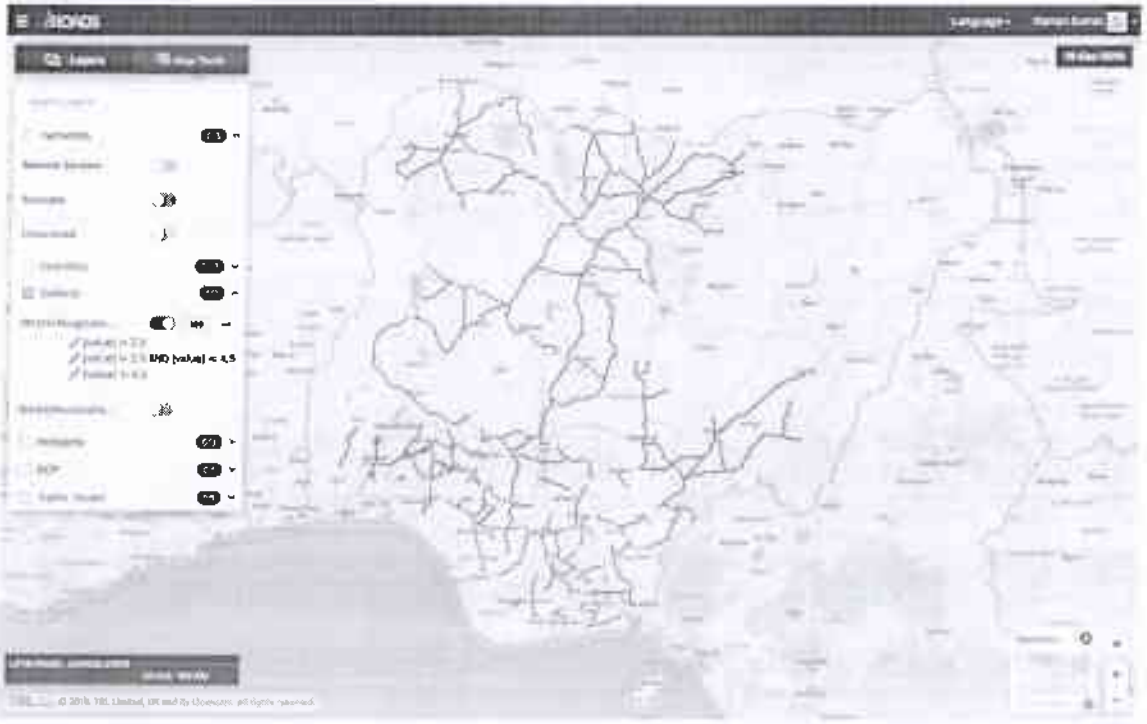


Figure 4-15 : IRI Condition Data on GIS Interface

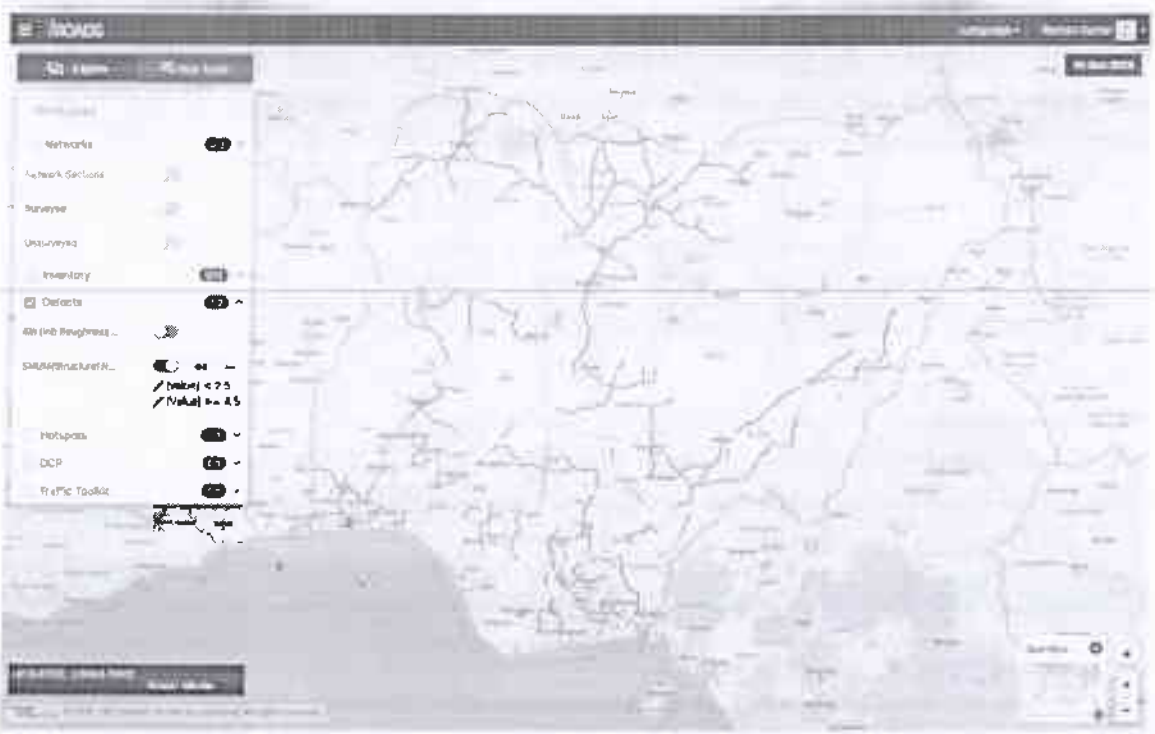


Figure 4-16 : SNUM Data on GIS Interface

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The system can use the uploaded condition to project future condition through user defined deterioration profiles, define treatments and effects of treatments, and generate forward works programmes with associated maintenance budgets.

The diagram below shows the process flows involved in the PMS component of the iROADS RMMS.

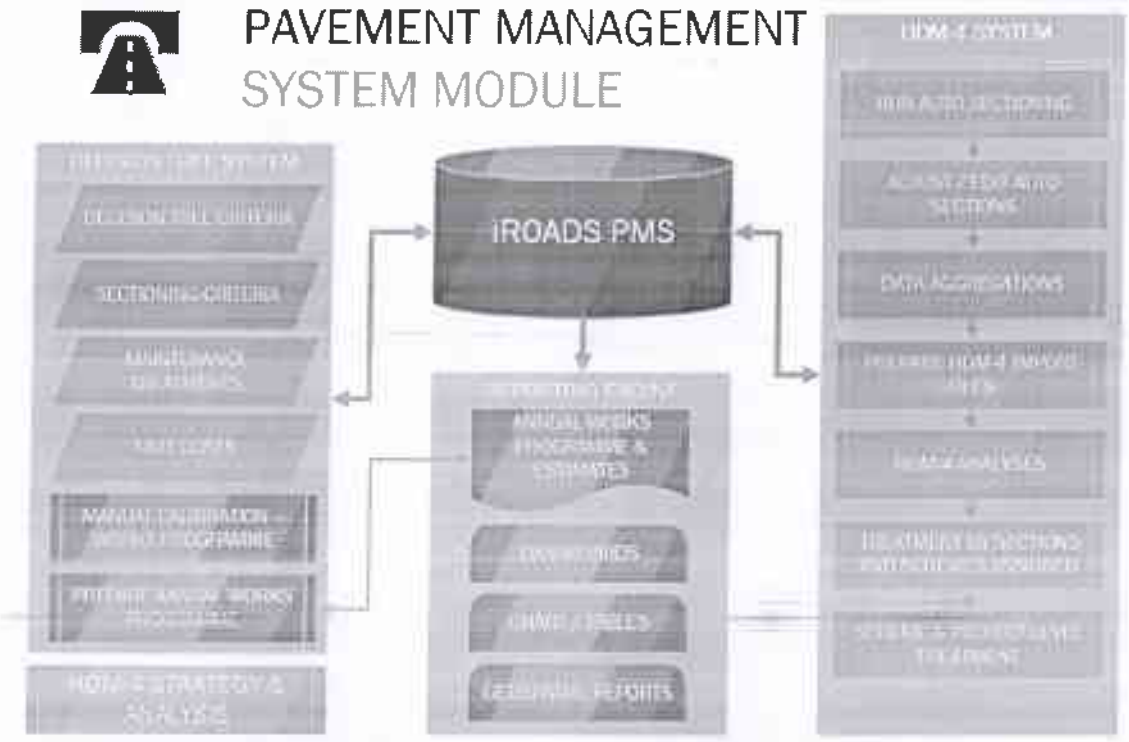


Figure 4-17 : Process Flow - Pavement Management Module

iROADS can model pavement performance based on user defined single or multiple defect surveys. Using data from within the system, users can specify algorithms and rules to generate performance indices based on one or more aspects of performance (e.g. condition defects). It also allows for treatments and treatment selection rules to be defined and applied to all or parts of road types in the road network. Using the selected maintenance treatments, the corresponding forward works plans can be generated.

The forward works programme generated using the condition data collected in the system can be found in the below screenshot.

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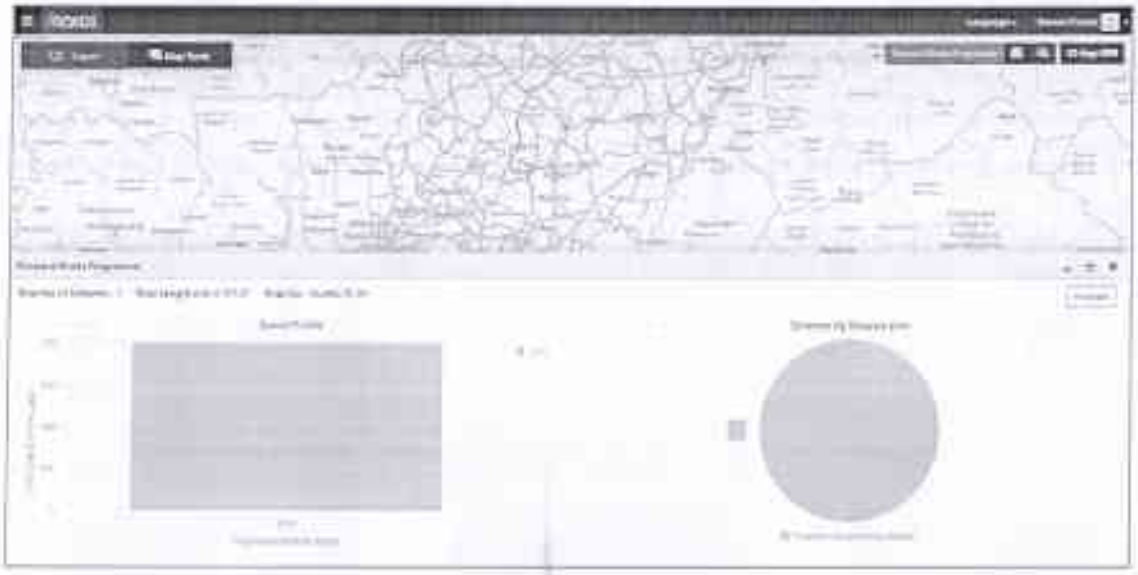


Figure 4-18 : Forward Works Programme

iROADS allows for user defined pavement deterioration relationships to be defined and used at the tactical level for the analysis of maintenance options for specific lengths of carriageway to show the pavement deterioration in network level strategic analyses.

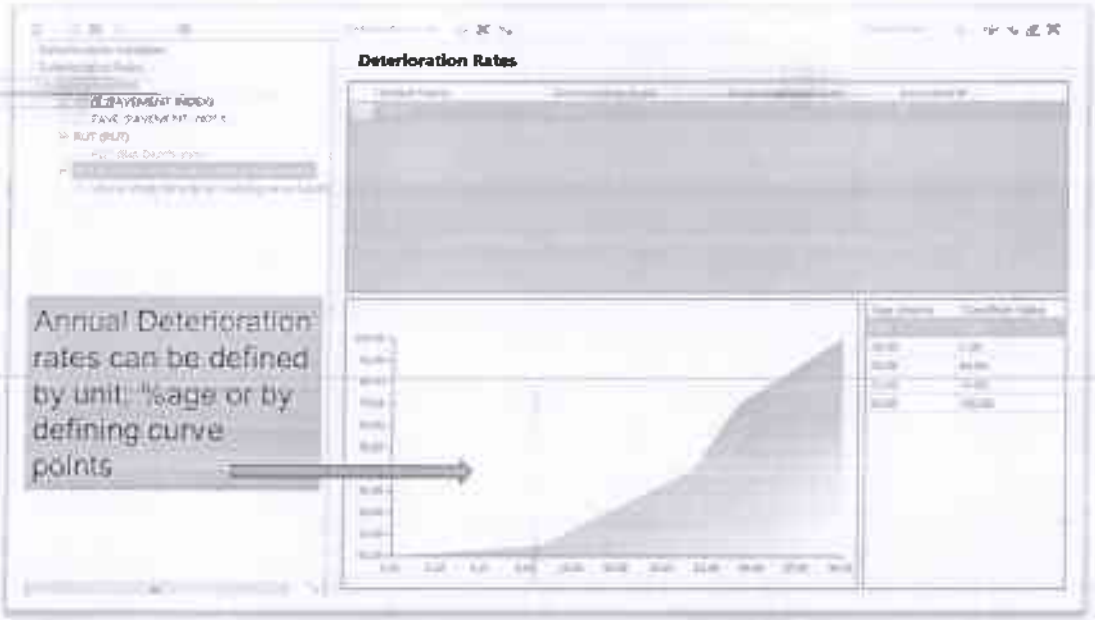


Figure 4-19 : iROADS - Deterioration Models

iROADS is currently used to undertake whole life cost and cost benefit analyses. iROADS currently prioritises maintenance works using Economic Indicators to show the benefits of one or more maintenance options compared with another.

As part of the implementation of iROADS asset deterioration models can be used to allow predication of depreciation in the value of the network to be carried out. This aspect will

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also draw on data from the other asset components on the network but the analysis will be undertaken in the Pavement Management System.

The screenshot below shows the results of the projection analysis from the iROADS system.



Figure 4-20 : iROADS – Condition Projection Analysis Results

A wide ranging and flexible capability for reporting is available in iROADS to support decision making processes. The reports cover all aspects of data and network analysis results expected from the Pavement Management System.

The PFI module within iROADS allows the customers to upload the carriageway, footway network and calculate the road condition indices from the condition data collected as part of various surveys, and produce reports based on the calculated condition indices. The uploaded data can be viewed, accessed and analysed to understand the road conditions and report condition indices periodically to the authorities.

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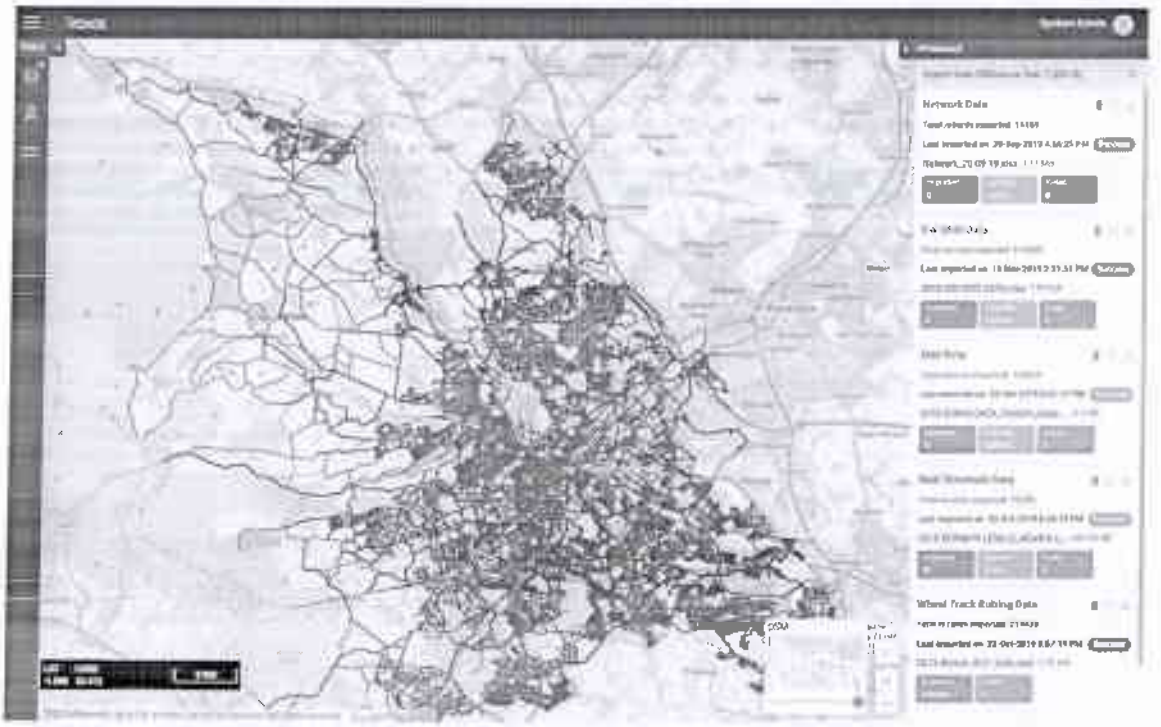


Figure 4-21 : iROADS PFI Module with Network and Condition Data Uploaded

The system audits all the changes made to the data so that the source data and results can be audited by the independent auditors at any future point in time.

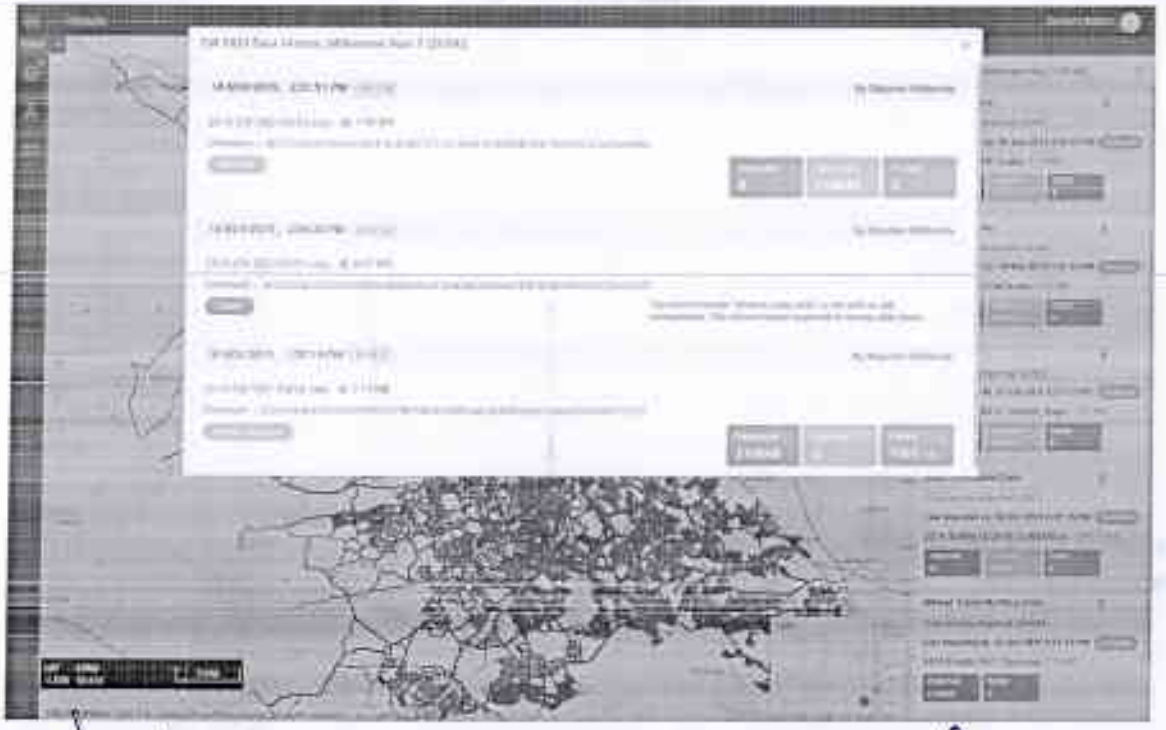


Figure 4-22 : iROADS Data Upload History

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Once the Network data, Carriageway Section Condition Index Data, SCRIM data, SCRIM Threshold data and the Footway Condition Index data for a particular year were uploaded the system automatically calculate the condition indices and allows the user to export the results in PDF, CSV formats for further reporting.

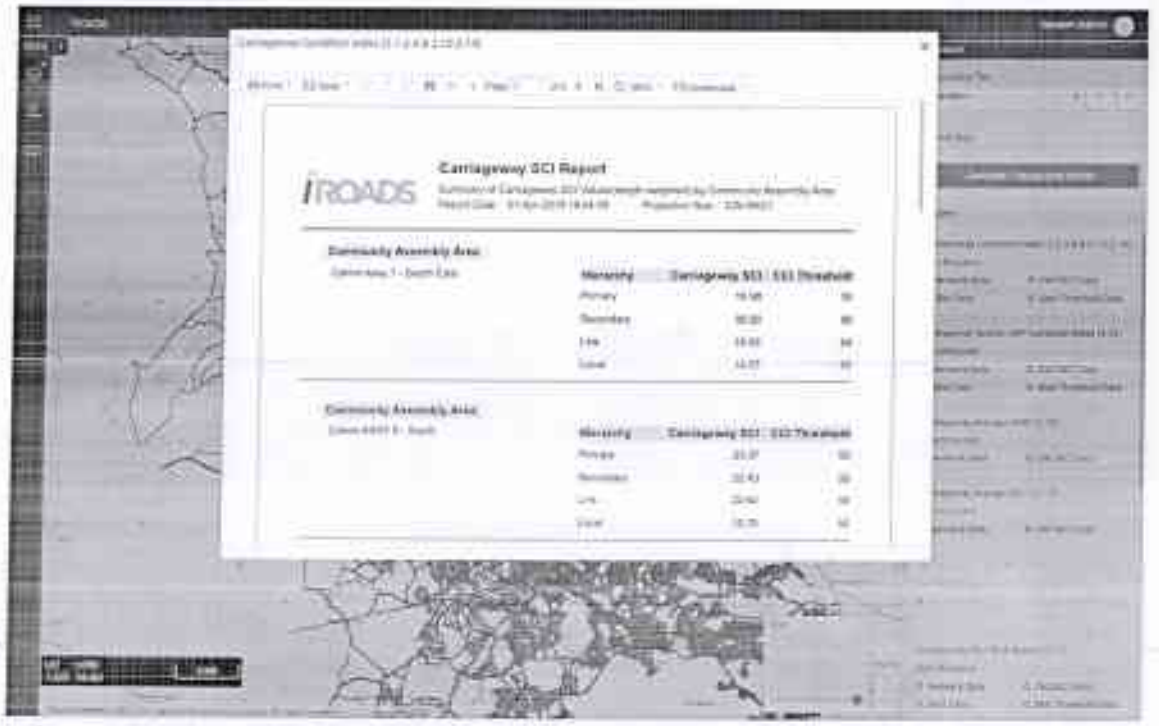


Figure 4-23 :iROADS Carriageway SCI Report

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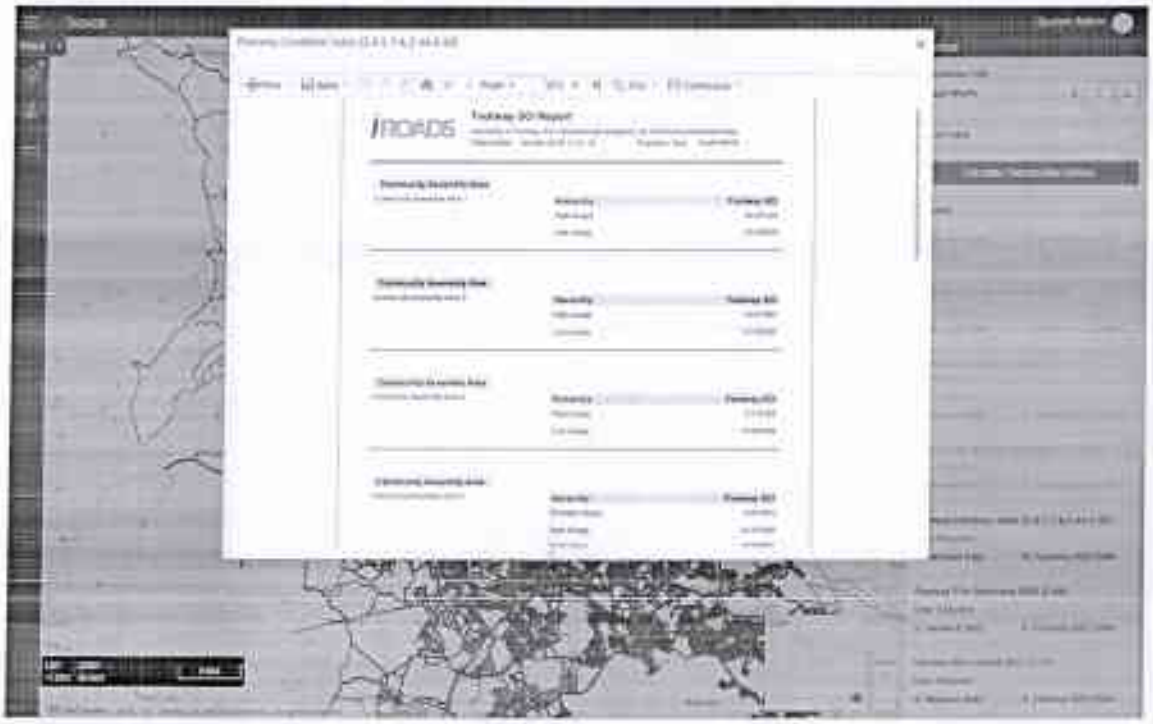


Figure 4-24 : Footway SCI Report

4.1.1.4 Lifecycle Management System

The iROADS analysis capabilities include strategic and tactical analyses for pavement maintenance. In addition, TRL has models that can use data exported from pavement asset systems to undertake more detailed analyses of budget requirements to reach a specified target network condition, or to predict the network condition from specified levels of budget. These stand-alone models can be incorporated into iROADS if these are agreed to provide the required functionality.



The strategic analyses can be undertaken with different treatment intervention policies to enable different maintenance policies to be assessed. For example, different treatments, or different thicknesses of the same treatments,

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may be used on different road types or in different areas to show the change in value for money achieved over the analysis period and prioritised in order to provide the most cost effective maintenance programme.



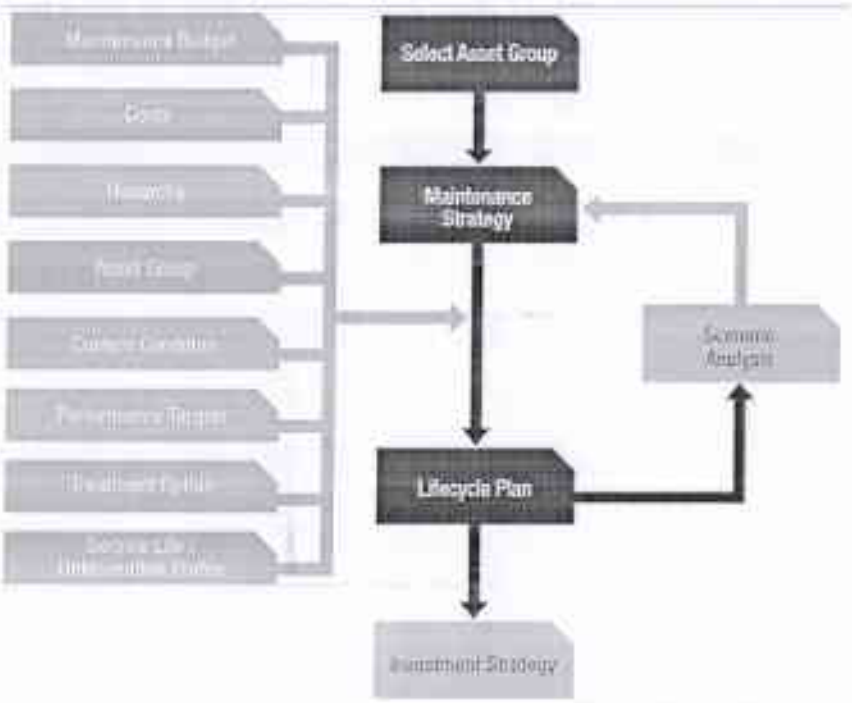
Figure 4-25 : Lifecycle Definitions

For the tactical, project, level analysis of maintenance schemes, iROADS uses deterioration curves for each defect that can be calibrated for the pavement types on specific networks using historic condition data from that network. iROADS contains deterioration relationships which have been established from data in the UK and elsewhere but the relationships may be able to be calibrated against the condition data available at KSTP or KSTP may have relationships for the road network that can replace the existing iROADS relationships. If the current iROADS relationships are to be calibrated then it is assumed that KSTP will provide the necessary data. The results of tactical analyses for one or more maintenance schemes are prioritised to show the most cost effective maintenance options.

For tactical analyses multiple options may be considered for each scheme and the prioritisation process based on an Economic Indicator showing the value for money from each option will be used to automatically select the best maintenance options for the programme.

By using a common approach to maintenance programme development, the proposed programmes for different asset types (e.g. pavements and bridges) may be combined and the overall budget constraints applied to show the most cost effective maintenance options on all the asset types.

Both strategic and tactical pavement maintenance analyses can be undertaken as single year or life cycle analyses with user defined analysis periods and inclusion of different cost components, including non-agency costs.



If KSTP can provide the relationships for the variation in these cost components they will be incorporated directly into iROADS but if relationships are not available, the established relationships developed by TRL can be calibrated to the levels suitable for use by KSTP in the Road Asset Management System. Some of the non-agency costs used for pavements are appropriate to other asset types and can be incorporated at the same time (e.g. delays to traffic at roadworks) and others may not be needed (e.g. the change in vehicle operating costs on bridges may be too small to have an impact on the total maintenance cost).

Budgets for the multi-year analyses can be specified for each asset type for the whole network or broken down by area, road type and treatment type for each year of the analysis. Non-monetary aspects will be included in the analyses as part of the multi-criteria analysis capability.

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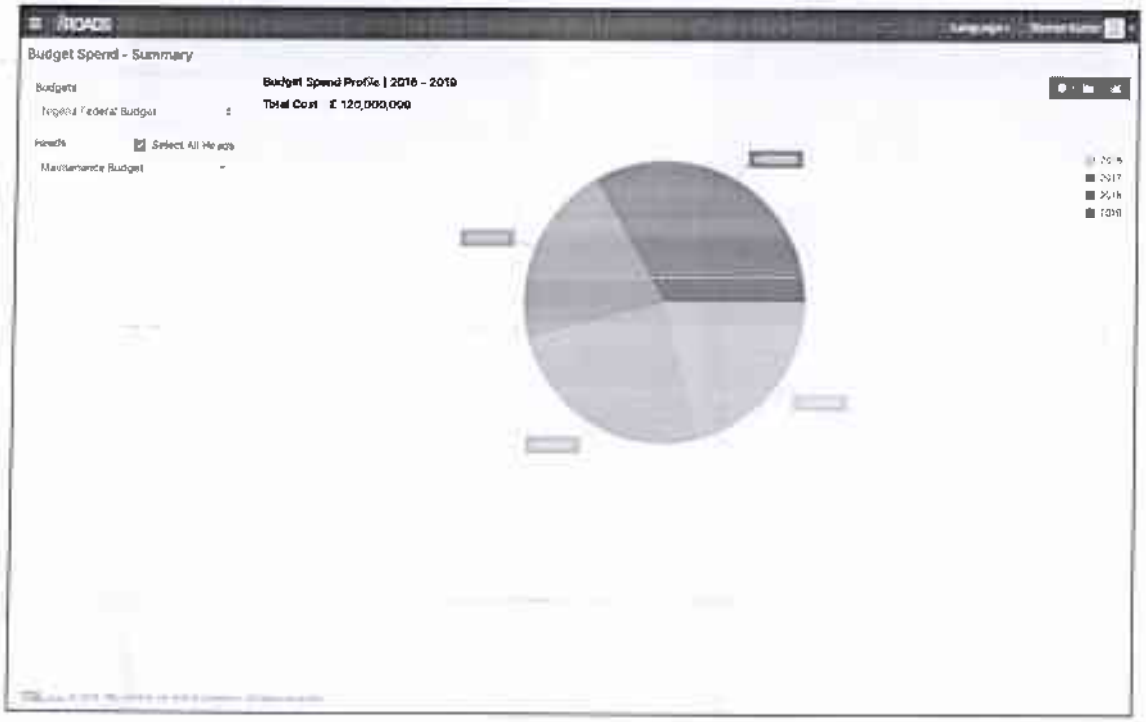


Figure 4-26 : iROADS - Budget Spend Summary

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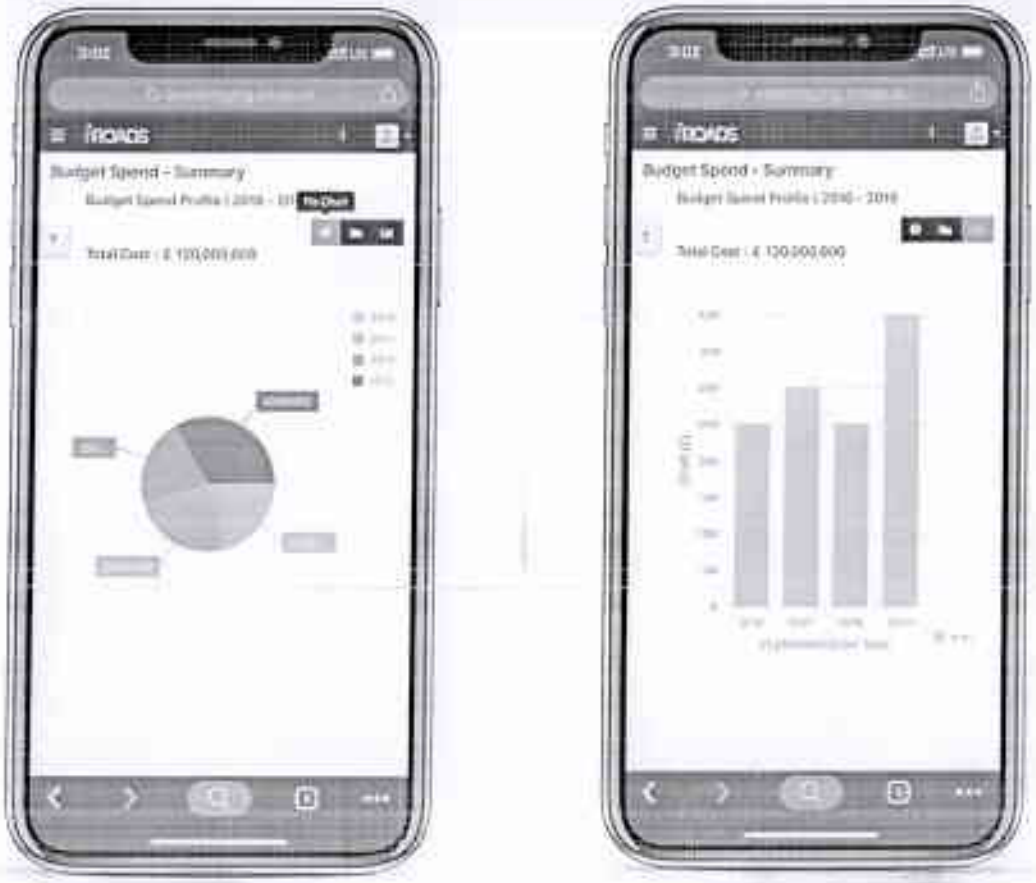


Figure 4-27 : iROADS Budget Spend Summary – Mobile View

4.1.1.5 Routine Maintenance and Management System (RMMS)

iROADS generates forward works programmes for pavement maintenance, and allows for the total or partial reset of asset condition after works are completed. This will be extended to cover the maintenance of all asset types stored in the system.

iROADS will generate multi-year maintenance work programmes for each asset group and identify the annual (routine maintenance) elements of work. The maintenance plans for the individual asset groups will then be integrated where feasible to provide suitable maintenance projects. The multi-year work programmes will be aligned with external systems (e.g. utilities) to create the maintenance plan for all asset types.

Unit rates for maintenance activities will be handled in iROADS, either through manual upload and used to establish the budget requirements for each packaged road maintenance project. Work packages will then be chosen to meet operational needs and generate the operational plan for all assets.

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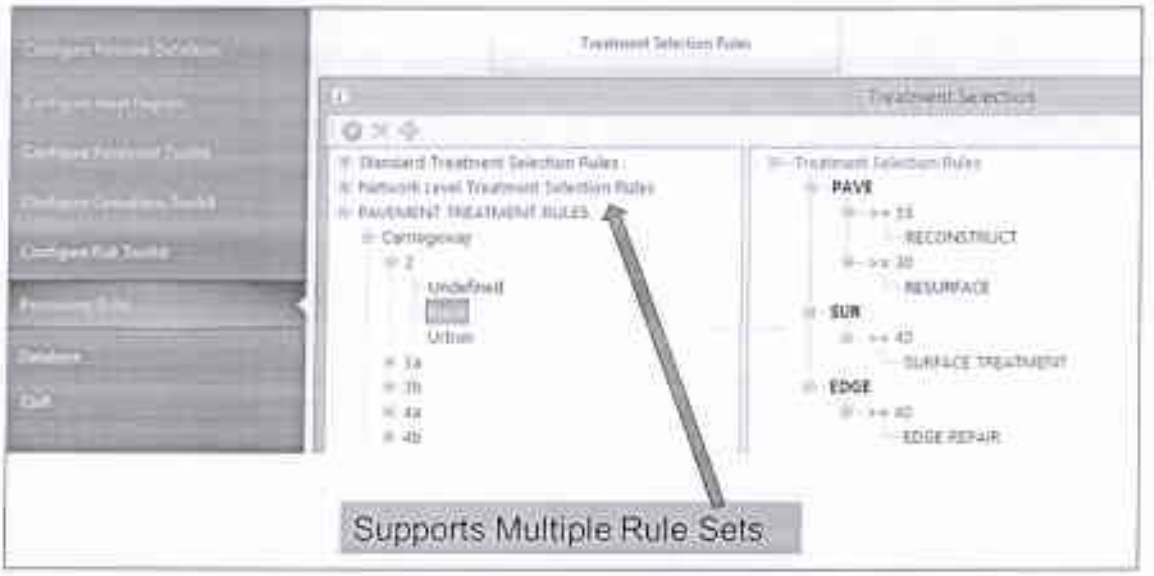


Figure 4-28 : iROADS - Treatment Selection Rules Configuration

4.1.1.6 Bridge and Culvert Information System (BIS)

iROADS stores inventory and inspection data down to the component level of bridges and culverts allowing all defects to be scored and all bridges and other structures to be ranked based on their condition.

The Bridge and Culvert Information System (BIS) module of iROADS allows for user configurable routine and principal inspection data to be stored against each inventory element and other relevant information (as images and PDF documents) to be attached to those inspections. The inspection data can be used to derive functional and structural performance indices for each bridge.



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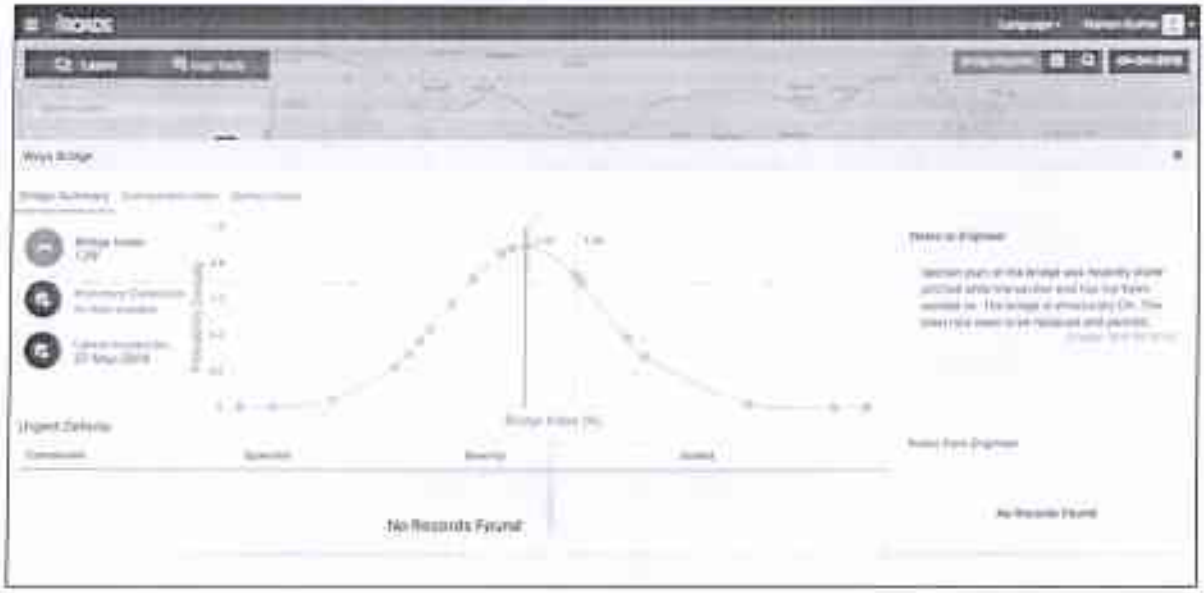


Figure 4-29 : iROADS - Bridge Summary Details

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Figure 4-30 : iROADS Bridge Summary Details - Mobile View

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The diagram below illustrates the BIS component of iROADS.

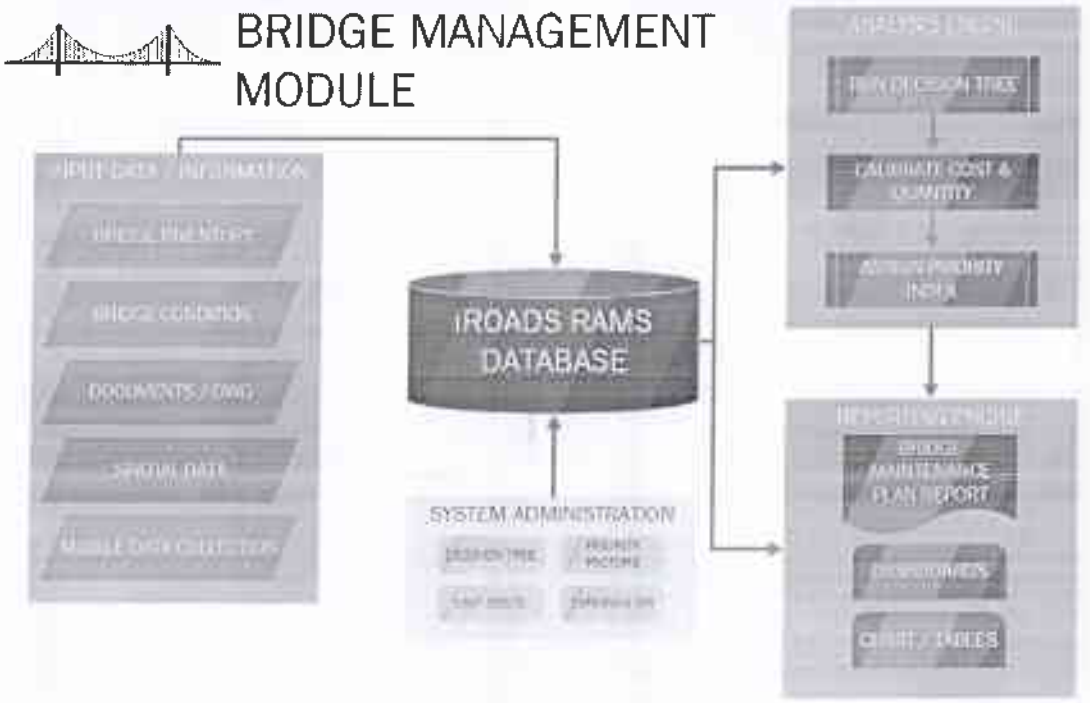


Figure 4-31 : Bridge Management Module

Based on the bridge deterioration model in Kerala, iROADS will be further developed to allow for simple deterioration relationships to be configured and rules defined for the prioritisation of the maintenance treatments based on the required objectives that will be proposed and agreed with KSTP.

The Bridge Management System will also be customised to incorporate unit rates for maintenance activities and calculate lifecycle costs for each maintenance strategy.

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Figure 4-32 : Bridge Inventory View

A wide ranging and flexible capability for reporting is available in iROADS to support decision making processes. The reports cover all aspects of data and asset analysis results expected from the Bridge Management System. The layouts of all reports will be proposed and agreed with KSTP and customised/configured during the implementation of iROADS. Standard report templates will be developed and used to report the asset conditions and maintenance programme details.

4.1.1.7 iROADS and HDM-4

iROADS has inbuilt functionality to export data to an HDM-4 workspace. The wizard guides a user through the steps needed to select the data sources and how they want to homogenise the data. During the setup the user can see the impacts on their raw data, as shown in the image below where the blue line shows the raw condition data and the red line shows the homogenised data based on the specific criteria specified.

iROADS has inbuilt wizard to export data to HDM-4 workspace.

TRL developed and released the latest reporting version of HDM4 for global release in November 19. The development for this work for HDM was done in Trivandrum by Experion.

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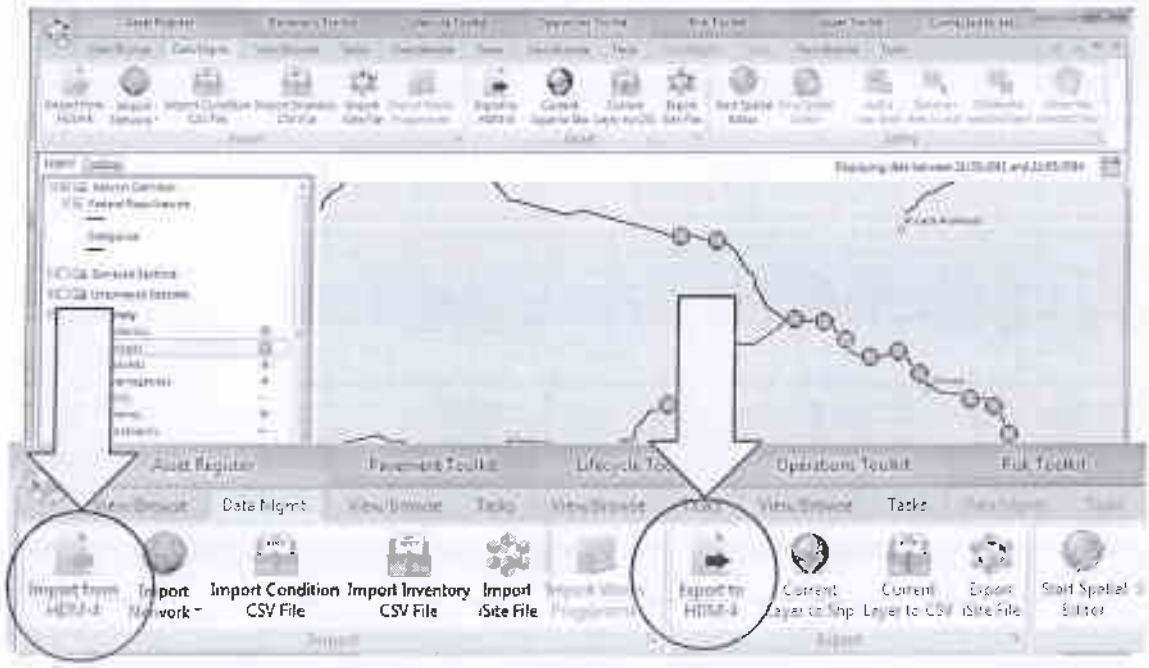


Figure 4-33 : iROADS & HDM-4 Integration

The process creates lengths of homogenous data based on the surveyed condition data stored in iROADS. This process can be carried out for a whole network, an individual road section or any length in-between. Once the setup has been completed iROADS will create the required export database tables which can be imported into the existing HDM-4 workspace.



Figure 4-34 : Homogenisation Graph

I/Climate/Emission data and models:

The iROADS system has the ability receive, store and use the environmental, climate and emission data. The emission data stored within the system shall be used viewing and querying purposes.

The screenshot below shows the 'Air Quality Management Areas' identified within the UK, by different local authorities after reviewing and assessing of air quality in their area. This task involves the measurement of current pollution values and predict the future pollution through emission models.



Figure 4-35 : iROADS - UK Air Quality Management Areas

'Transport Enhancement Emission Modelling' system, which is another proprietary software from TRL can be used for developing emission models and projecting the future emission rates/trends by combining vehicle fleet, speed flow and traffic flow data. The emission projections results can be plotted on the GIS interface and can be viewed as graphical charts.

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Figure 4-36 : TEEM - Emissions by Road Profile

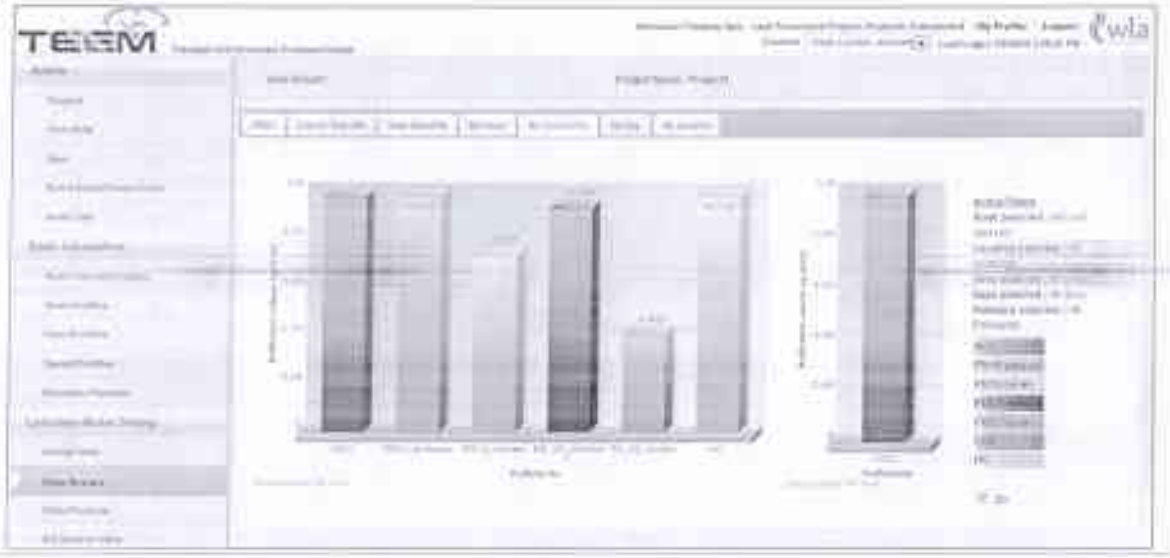


Figure 4-37 : TEEM - Emissions by Pollutants

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Figure 4-38 : TEEM - Emissions by Hour



Figure 4-39 : Emissions By Source

4.1.2 *Field Data Collection Mobile Applications from TRL*

TRL had developed and customised mobile applications for different customers which is primarily used for survey data collection, audit data collection and collecting road crash data from the crash scenes. The mobile applications are developed in such way that it works online (with internet connectivity) and offline (without internet connectivity) for collecting the data. The data collected using the mobile application will be synchronised with the central server using the internet connectivity.

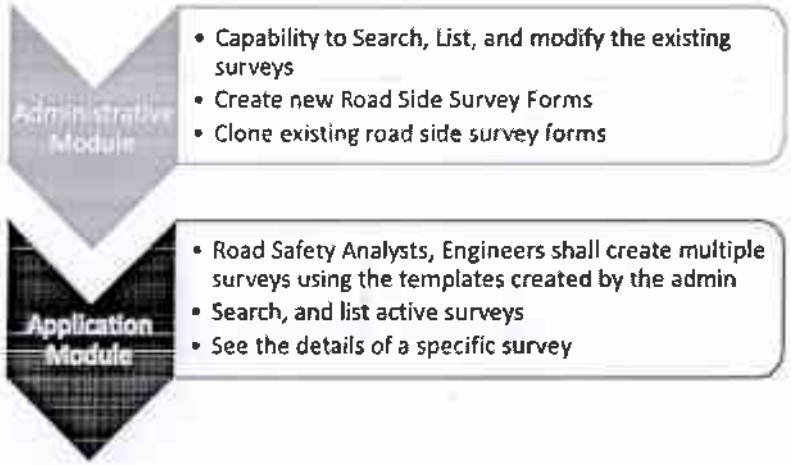
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4.1.2.1 *Survey Data Collection Mobile Application*

The Survey data collection mobile application from TRL was used by the survey data collection team, field engineers for conducting and uploading the survey data directly from the survey sites/locations. The capabilities of the survey data collection mobile application are listed below.



- Capability to Search, List, and modify the existing surveys
- Create new survey Forms (Inventory, Condition Data etc.)
- Clone existing survey forms Inventory, Condition Data etc.)
- Safety Analysts, Engineers shall create multiple surveys using the templates available
- Collect the data using the survey forms
- Upload photos, videos and documents using the mobile application
- Search, and list active surveys
- See the details of a specific survey in web and mobile interface

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Figure 4-40 : Survey Data Collection Application – Data Collection Form

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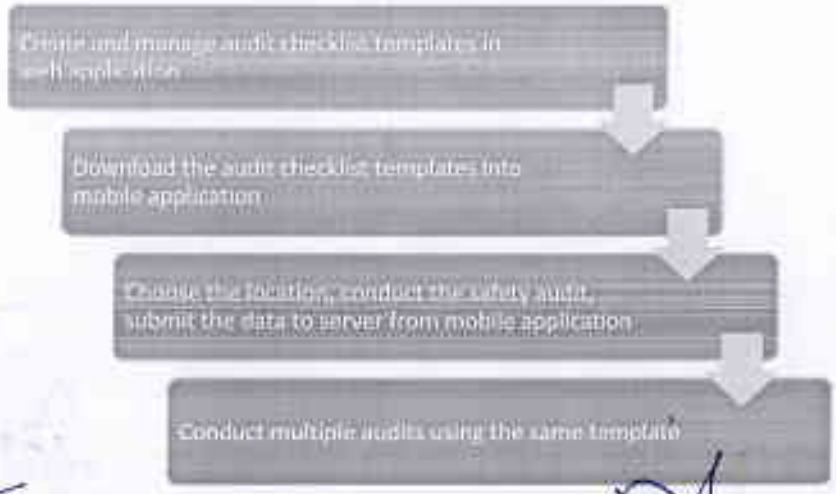
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Figure 4-41 : Survey Data Collection Application - Survey Listing

4.1.2.2 *Safety Audit Data Collection Mobile Application*

The safety audit data collection mobile application was used by the road safety auditors, road designers and field engineers for conducting and uploading the safety audit data directly from the audit sites/locations. The capabilities of the safety audit data collection mobile application are listed below.



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Figure 4-42 : Audit Data Collection Application - Data Collection Form

4.1.2.3 *iROADS DCP Survey Data Collection Mobile Application*

TRL Infrastructure Team was using paper based log sheets for recording the results from the iROAS Dynamic Cone Penetrometer (DCP) site measurements. The paper sheets containing the results are then manually entered into a database tool. This is a very inefficient process, and results in waste of time, money as well as adds quality issues.

TRL Software team developed a mobile application to improve the efficiency, reduce the manual errors during the DCP logging and entry process, and most importantly to provide the facility to TRL infrastructure team to configure the master data required for DCP data collection as well as to pull out reports from the data at any point of time using TRL's iROADS web application. The web application was hosted in TRL's Cloud Infrastructure and the mobile application was installed in the TRL Android devices used by DCP team. Currently, the DCP survey team is using the mobile application for collecting the data from the test sites.

The capabilities of the mobile application include,

> Project Listing – To list all the projects created in the system

> Shift Setup – Allows the users to configure different shifts in the system and add resources against the shifts

> Shift Listing – List all the shifts created under a project

> Test Setup – Allows the users to setup different tests against a shift

> Tests – Tests screen is used to list the tests configured against a particular shift

> Record Drops – Allows the users to collect the survey data from the test site

> Export Data – Allows the users to export the survey data in CSV format

> Share Data – Allows the user to share the data to pre-configured e-mail address



Figure 4-43 : iROADS Dynamic Cone Penetrometer mobile application - Test Setup & Drop Data Collection Form

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The web application allows the user to configure the projects, and the master data required for the iROADS DCP mobile application. The survey data collected using the iROADS mobile application can be synced with the web application using the internet connectivity available in the mobile application. The survey data can be accessed, viewed and analysed using the iROADS web application.

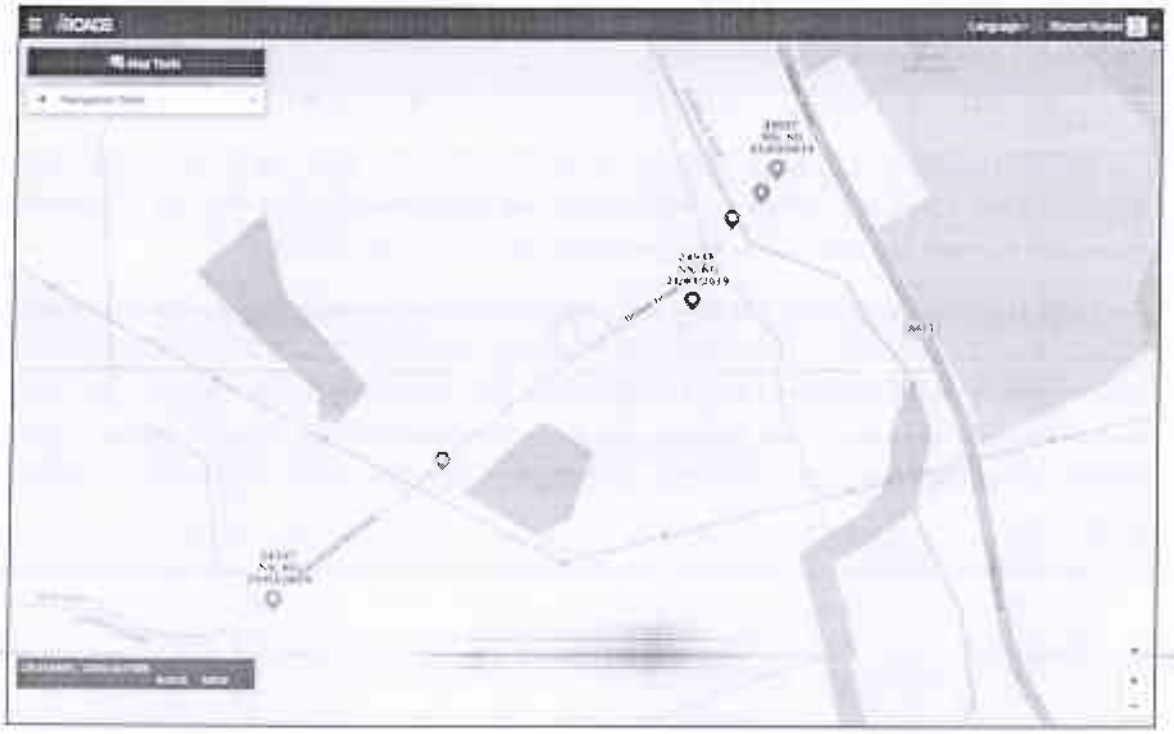


Figure 4-44 : DCP Survey Locations in iROADS Web Application

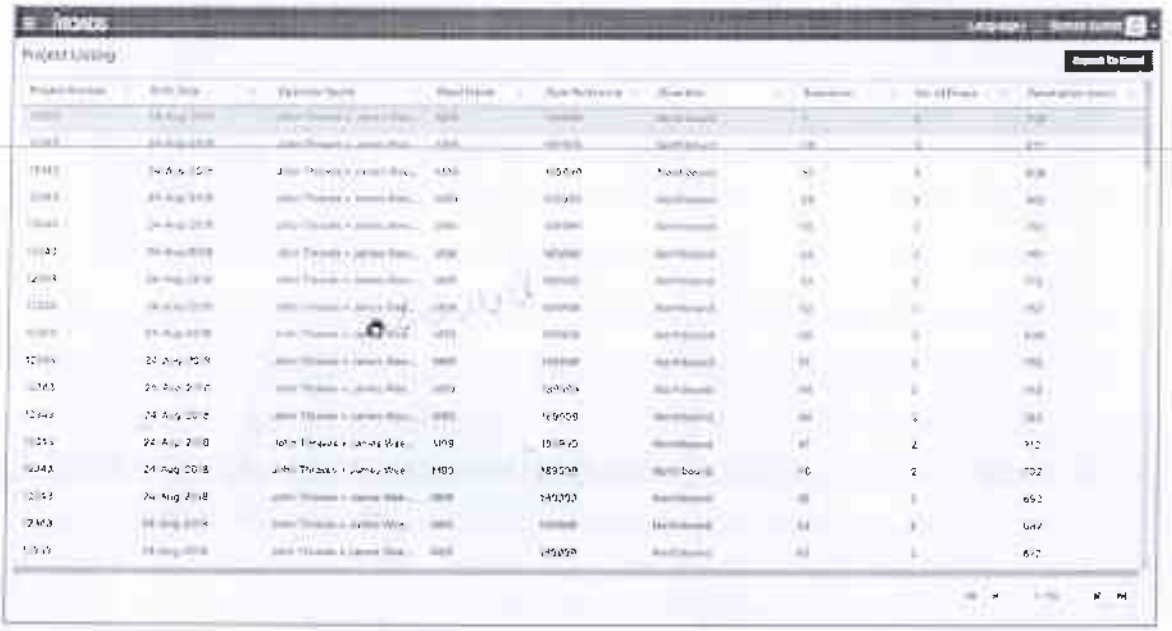


Figure 4-45 : DCP Survey Data Listing in iROADS Web Application

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4.1.2.4 *Mobile Asset Data Management Solution 'iCAPTURE' from TRL*

The iCAPTURE suite is a mobile survey collection software that supports Windows based tablet systems. The on-site software integrates with iROADS to facilitate the acquisition of mobile data collection. The iCAPTURE software is used by site operators in support of Risk Analysis and Value Management surveys.

It works by exporting data from iROADS as an XML file. The XML file is then read and updated by the iCAPTURE software whilst out in the field. Once back in the office iROADS can import the XML file and update the associated data records in iROADS.

iCAPTURE is UKPMS compliant for CVI, DVI and FNS surveys in accordance with the latest UKPMS Visual Survey Manual. Our expertise in writing the UKPMS Visual Survey Manual and working with survey companies has allowed us to produce software which is easy to use and train with whilst also maximising the outputs of the surveyors. The UKPMS CVI software can be used as a walked or driven survey and can be connected directly to a number of on board odometers.



Figure 4-46 : iROADS iCAPTURE Mobile Application being used to asset collect data from a project in the Middle East

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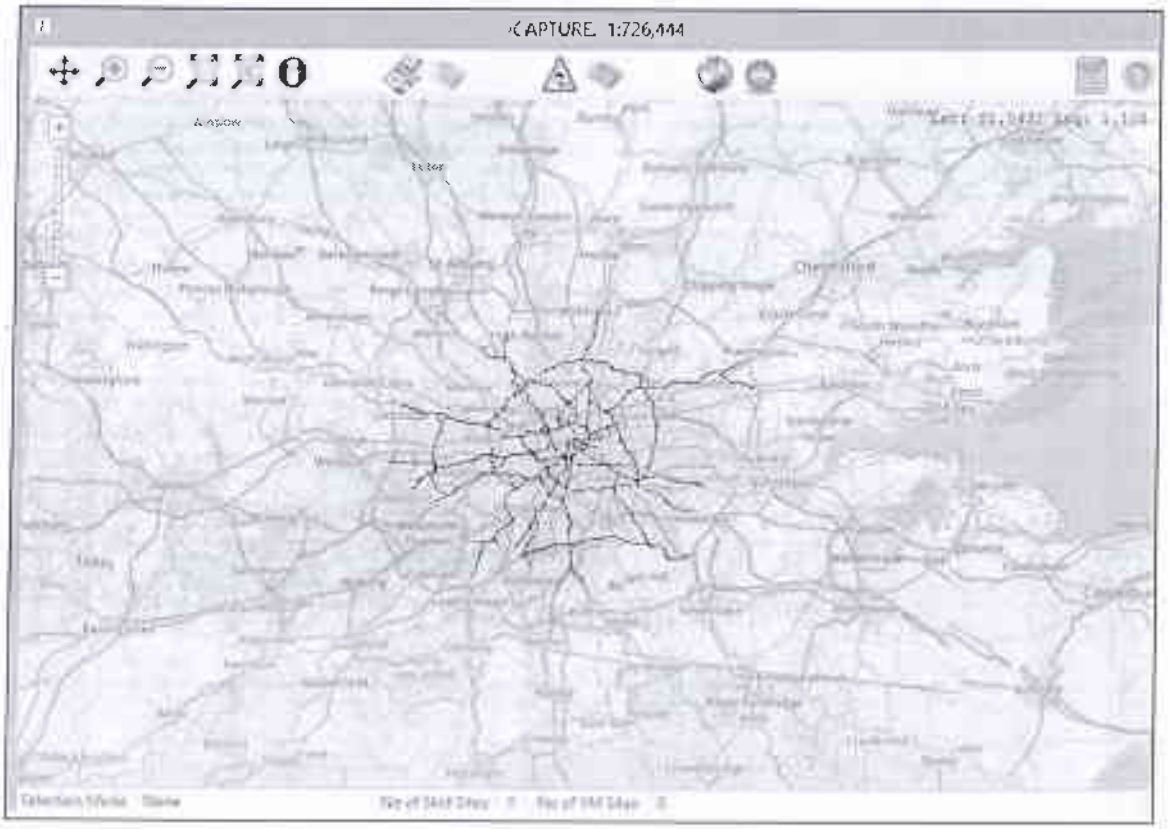


Figure 4-47 :iROADS iCAPTURE - Surveyed Sections

4.1.2.5 *Public Facing Mobile Application*

The public facing mobile application developed by the Consultant allows the general public to report various incidents, emergencies, property/asset damages using the mobile application. The capabilities of the mobile application support reporting of road traffic crashes, reporting of asset damages related to the road traffic crashes and receive traffic alerts etc.

The general public can download the application and register themselves by providing details. Once the user registration is successful, they can use the mobile application to report incident/asset damages by specifying the location details along with photographs and videos etc. The grievance reports will be synced to the central server and will be available for the respective authorities for their review and corrective actions. The public users can receive notifications regarding the status of their grievance record in the



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mobile application.



Figure 4-48 : Public Facing Mobile Application - Kuwait

4.1.2.6 Crash Data Collection Mobile Application

The crash data collection mobile application from TRL allows the users to collect the crash data from the crash scene. The data collected using the mobile application is immediately synced with the central server using the internet connectivity available in the mobile device. The application can be used in offline mode for data collection purposes. The high-level capabilities of the crash data collection mobile application are,

> User Login Module: This module will be able to handle user logins to the mobile application.

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- Dashboard – The dashboard screen shows the information about the number of crash records pending syncing with the central server and a list of recently reported crashes.
- Capability to Search, List and View Crash Records Summary – The system allows the user to search the crash records available online as well as the crash records available offline.
- Crash Records Listing – The 'Crash Records Listing' screen lists the latest 'x' number of crash records for which the logged in user has access to.
- View Crash Records Details: This feature allows viewing of Crash information, Vehicle information, Casualty information, and the photos and videos corresponding to a crash record.
- Add New Crash Records: The system allows the user to add new crash records. The crash record can be directly synced to the server when the mobile application is connected to the internet. If the mobile application is not connected to the internet the system can save the record locally and shall sync the record to the server when the mobile application is connected to the internet again.
- Update Existing Crash Records: The system allows the user to update the crash records using the mobile application. The changes can be directly saved to the server when there is an internet connection. Otherwise, the changes can be stored locally and synced to the server when the mobile application is connected to the internet again.
- Delete Crash Records: The system allows the user to delete the crash records using the mobile application. The record can be directly deleted from the server when there is an internet connection. Otherwise, the record can be deleted when the mobile application is connected to the internet again.
- Offline Record Storage: The mobile application supports offline storage and a maximum of 25 crash records can be stored offline.
- Attachments: The user can upload photos, videos using the mobile device and attach the same in the crash record (with a total file size limit of 5 MB by default and can be configured in a web application).
- Location through GPS: The application shall capture the location data using the GPS feature of the mobile device.
- Data Validations: The application can perform the necessary validations before saving the data.

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Figure 4-49 : iMAAP Crash Data Collection and Crash Record Summary View

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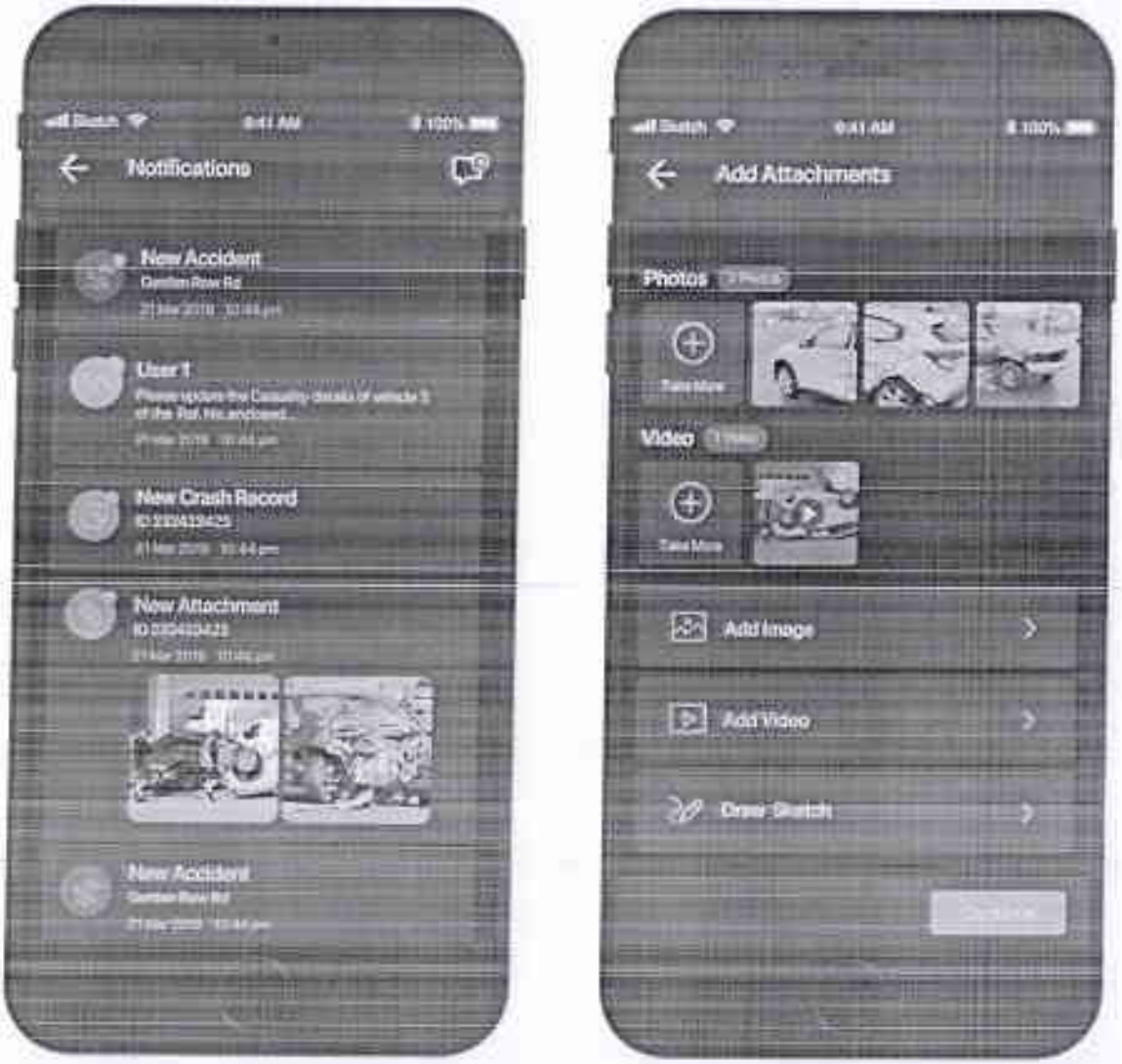


Figure 4-50 : iMAAP Notifications & Attachments Uploader

4.1.3 Technical Architecture of the system

This section summarises the technical architecture of the system and the technologies/components/frameworks used in the system. This also sets out the hardware/software requirements required for hosting the system at the State Data Centre (SDC).

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4.1.3.1 *iROADS Architecture Overview Diagram*

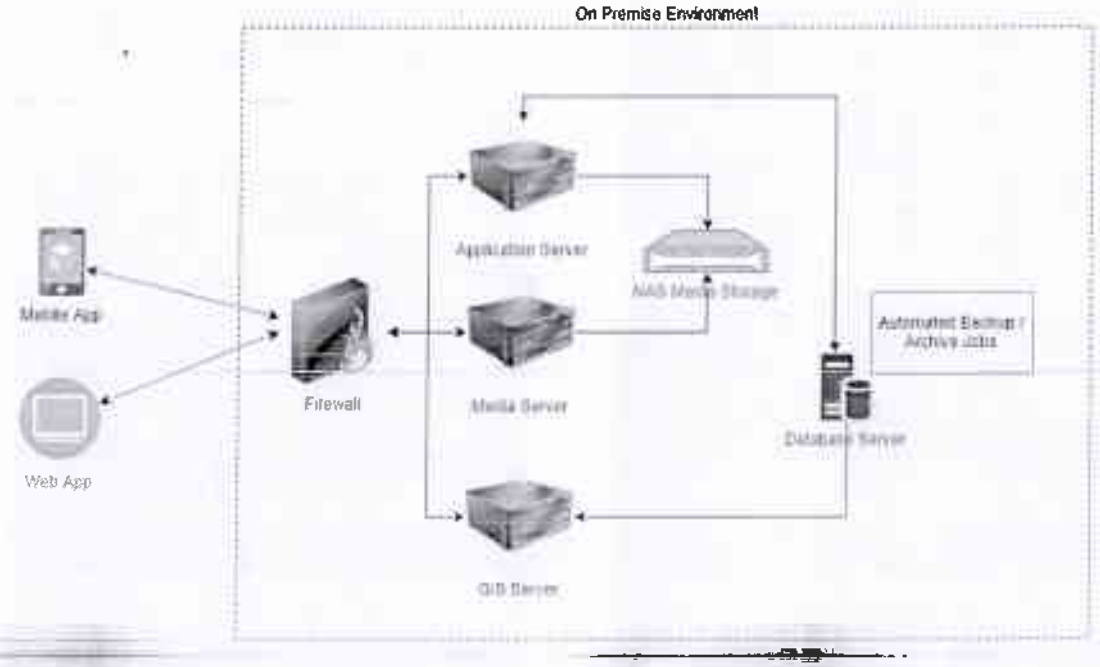


Figure 4-51 : iROADS Architecture Overview

4.1.3.2 *Technology Stack*

The following are the key system components of iROADS web application.

#	Hardware Component	Technology	Licensing Model
1	Presentation Layer	Angular 8, HTML5, CSS3, Bootstrap	Open Source Technologies
2	API Layer	RESTful Web APIs	Open Source Technologies
3	GIS Service Layer	GDAL, Python, GeoServer, Flask	Open Source Technologies & Software
4	Application Backend Layer	ASP.Net Core 3.x, Node JS 8.x	Open Source Technologies
5	Data Access Layer	Entity Framework Core 3.x	Open Source Technology
6	Database Layer	PostgreSQL 12.x	Open Source Software
7	Charting/Reporting	Wijmo Enterprise / DevXtreme / Stimulsoft	3rd party libraries. No additional licensing requirements.

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		Reports	
8	Video Streaming	Universal Media Server	Open Source Software

4.1.3.3 *Advantages of the architecture*

This section lists out the key advantages of the architecture of the system.

4.1.3.3.0.1 Pluggable Implementation Specific Modules

The system architecture supports to add or modify features/modules specific to each implementation. For example, it is possible to extend the set of standard reports specific to an implementation. The data extraction, processing and reporting logic can be isolated to pluggable modules, so that the set of standard reports can be extended without modifying the base business module.

4.1.3.3.0.2 RESTful Web API based web services for integration

RESTful APIs provide an opportunity to reuse the backend systems for both web and mobile applications. APIs are designed properly considering the business goals.

The architecture of the proposed solution uses ASP.NET Core Web API to expose the backend services to different customer-facing applications. Following goals are considered while designing the APIs:

- Enabling self-service for app developers and app users alike.
- Reducing barriers to accessing valuable enterprise resources.
- Prioritising the needs and preferences of client application developers.
- Encouraging collaboration between and among internal and external resources.
- Addressing the security and scaling issues of exposing IT assets to the open market.
- Maximising the business value of the interface.

While designing the APIs, the focus was not only on functionality but also on user experience. The design must be developer-centric and focus on providing the lowest possible barrier to entry for the target developer audience. All web services are following Pragmatic Representational State Transfer (REST) style which is simpler, more web-centric approach to designing integration interfaces. This style uses URI (Uniform Resource Identifier) instead of WSDL (Web Services Definition Language) and is transport-specific (it exclusively supports HTTP). This style of programming also helps the developers as the learning curve is very minimal compared to other web service programming styles like WSDL, SOAP (Simple Open Access Protocol), and RPC (Remote Procedure Call) etc. The Pragmatic REST style is very popular nowadays because URI is intuitive and web and mobile

developers are most familiar with RESTful interfaces. Hence, the developer adoption and productivity are likely to be high. Furthermore, the concentration on HTTP makes Pragmatic REST APIs ideal for developing today's web and mobile applications.

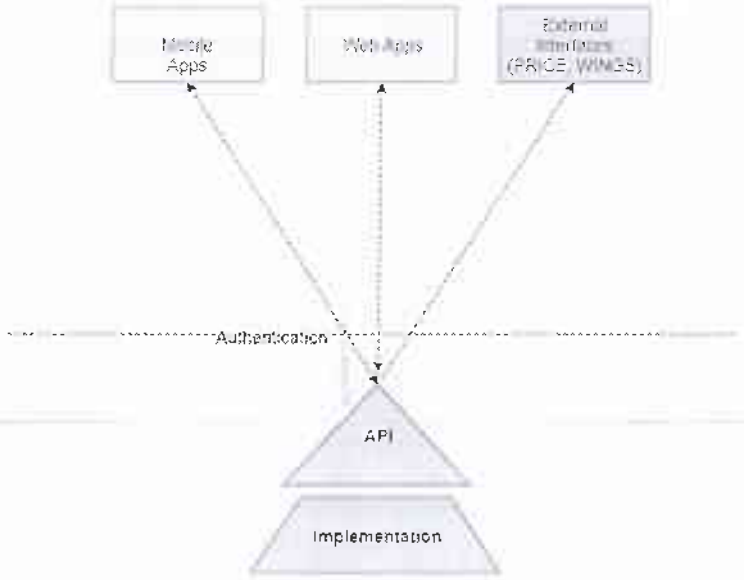


Figure 4-52 : API Strategy

4.1.3.3.0.3 Streaming digital data

The architecture of the proposed system considers the capability of the system to store and stream different video files on-demand with high speed. Considering this requirement, the architecture of the proposed system recommends to have the digital media stored in a network attached storage (NAS) device and use a media server application to stream this digital media.

A media server either refers to a dedicated computer appliance or a specialized application software that can store and share media files. A media server can be any device with network access and adequate bandwidth for sharing and Universal Media Server is an open source and powerful media server providing a stable and reliable interface to end users. The software can be easily configured to run on any PC or NAS open source software with a simple series of steps. Universal Media Server has strong support from developers who keep it up-to-date with new features, while performing bug fixes. The program streams or transcodes video, audio and image formats with little or no configuration.

Universal Media Server is capable of serving videos, audio and images to any DLNA-capable device. It supports streaming to many devices including Sony PlayStation, Microsoft Xbox, TVs, smartphones (iPhone, Android, etc), Blu-ray players, and more.

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Universal Media Server supports all major operating systems, with versions for Windows, Linux and Mac OS X.

It's powered by FFmpeg, MEncoder, tsMuxeR, MediaInfo, OpenSubtitles and more, which combine to offer support for a wide range of media formats. saving media files. Universal Media Server (UMS) is one such media server software.

4.1.3.3.0.4 Data Archiving and Backup Capability

Data archiving and backup is an important capability be built in the system. Since the application to be hosted in a on-premise data centre, this capability needs to be manually provided in the database server.

For archiving, there shall be a scheduler job written which can archive the data from the database to a network storage space. The schedule for the job can be controlled by configuration parameters. These configuration can be when to archive the data, what data to be archived, etc.

Similarly, for backup, there shall be a scheduler job written which can backup the database (full / incremental) to a network storage space. The backup schedule and type can be made configurable.

At any point of time, the database can be restored from the archive / backup that is created. But this will be a manual job.

4.1.3.3.0.5 Integration and management of mobile apps with the central RMMS database

The mobile applications in the proposed solution will always be talking to the API services provided in the proposed solution. At any time, these mobile applications will never talk to any other external API services. If there is a need to integrate the mobile applications with central RMMS database, we shall create new API end points in the proposed solution which can talk to this central RMMS database and retrieve necessary information from this database. These newly created API end points can then be used in the mobile applications.

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4.1.3.4 iROADS Deployment Diagram

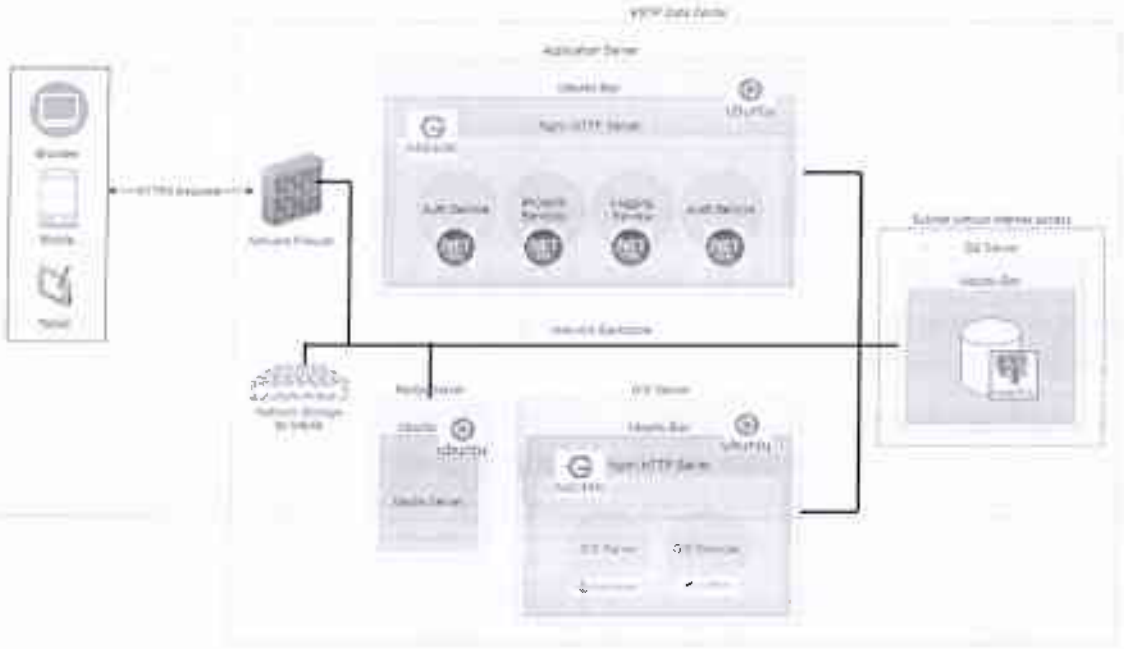


Figure 4-53 : iROADS Deployment Diagram

4.1.3.5 Hardware/Software Requirements

iROADS application shall require 4 servers (physical/virtual) for its functioning. The application server will be used for deploying the .Net Core, and Angular applications. The GIS server will be used for deploying the Python-based GIS services and GeoServer. The media server will be used for deploying the media server application. The database server will host the PostgreSQL database which will be used by the iROADS application.

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4.1.3.5.0.1 Production Environment Requirements

Application Server (Production): The recommended configuration of the application server (production) is given below.

Hardware Component	Configuration
Processor	2 CPU
RAM	8 GB
OS	Ubuntu 18.0.4
HDD	50 GB SSD
Internet	10 Mbps guaranteed
Software Installations	Kestrel HTTP Server, Nginx, .NET Core Runtime, Node
Other Requirements	Enable Outbound/Inbound Rules for port 80 and 443 In addition, as per the client's SMTP server policies, enable the outbound rule for the SMTP server.

GIS Server (Production): The recommended configuration of the GIS server (production) is given below.

Hardware Component	Configuration
Processor	2 CPU
RAM	8 GB
OS	Ubuntu 18.0.4
HDD	100 GB SSD
Internet	10 Mbps guaranteed
Software Installations	Nginx, Python, Java, GeoServer, Apache Tomcat
Other Requirements	Enable Outbound/Inbound Rules for port 80 and 443

Media Server (Production): The recommended configuration of the Media server (production) is given below.

Hardware Component	Configuration
Processor	2 CPU
RAM	8 GB
OS	Ubuntu 18.0.4
HDD	100 GB SSD
Internet	10 Mbps guaranteed
Software Installations	Nginx, Java, Universal Media Server

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Other Requirements	Enable Outbound/Inbound Rules for port 80 and 443

Database Server (Production): The recommended configuration of the database server (production) is given below.

Hardware Component	Configuration
Processor	2 CPU
RAM	8 GB
OS	Ubuntu 18.0.4
HDD	200 GB SSD
Database	PostgreSQL 12.x with PostGIS extensions
Internet	10 Mbps guaranteed
Other Requirements	Enable Outbound/Inbound Rules for port 5432

4.1.3.5.0.2 Staging Environment Requirements

Application Server (Staging): The recommended configuration of the application server (staging) is given below.

Hardware Component	Configuration
Processor	2 CPU
RAM	4 GB
OS	Ubuntu 18.0.4
HDD	50 GB SSD
Internet	10 Mbps guaranteed
Software Installations	Kestrel HTTP Server, Nginx, .NET Core Runtime, Node
Other Requirements	Enable Outbound/Inbound Rules for port 80 and 443 In addition, as per the client's SMTP server policies, enable the outbound rule for the SMTP server.

GIS Server (Staging): The recommended configuration of the GIS server (Staging) is given below.

Hardware Component	Configuration
Processor	2 CPU
RAM	4 GB
OS	Ubuntu 18.0.4

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HDD	50 GB SSD
Internet	10 Mbps guaranteed
Software Installations	Nginx, Python, Java, GeoServer, Apache Tomcat
Other Requirements	Enable Outbound/Inbound Rules for port 80 and 443

Media Server (Staging): The recommended configuration of the Media server (production) is given below.

Hardware Component	Configuration
Processor	2 CPU
RAM	4 GB
OS	Ubuntu 18.0.4
HDD	50 GB SSD
Internet	10 Mbps guaranteed
Software Installations	Nginx, Java, Universal Media Server
Other Requirements	Enable Outbound/Inbound Rules for port 80 and 443

Database Server (Staging): The recommended configuration of the database server (staging) is given below.

Hardware Component	Configuration
Processor	2 CPUs
RAM	4 GB
OS	Ubuntu 18.0.4
HDD	60 GB SSD
Database	PostgreSQL 12.x with PostGIS extensions
Internet	10 Mbps guaranteed
Other Requirements	Enable Outbound/Inbound Rules for port 5432

4.1.3.5.0.3 Other Hardware Requirements

Client machines: The recommended configuration of the client machines that access iROADS application is given below.

Hardware Component	Configuration
Processor	2 CPU

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Hardware Component	Configuration
RAM	4 GB
OS	Any
HDD	50 GB
Internet	4 Mbps guaranteed
Software Installations	Anti-Virus

In addition to the above server configurations, it is recommended to have network storage for storing the media files (videos, pictures, etc.) associated with the application. The recommended configuration for this network storage device is given below.

Hardware Component	Production	Staging
Processor	Dual-Core 1.3 GHz	Dual-Core 1.3 GHz
RAM	1 GB	1 GB
HDD	8 TB	8 TB
Remarks	2-Bay Diskless Network Attached Storage 3.0 USB	

4.1.3.5.0.4 Indicative Costs for the procurement of Hardware Resources

The indicative costs for procuring the hardware resources from standard 3rd party cloud service providers like Amazon AWS or Microsoft Azure is INR 30,000 per month. TRL can host iROADS either with Amazon or Microsoft as both are Ministry of Electronics and Information Technology (MeitY) empanelled Cloud Service Providers. All the data and user accounts will remain only in India as specified by Ministry of Electronics and Information Technology. This is an option that TRL can discuss with the Client during implementation.

The cost details for replicating/procuring the same infrastructure in SDC owned Cloud Infrastructure cannot be estimated now as the costs for the services offered by SDC is not available in the SDC website (http://www.itmission.kerala.gov.in/projects/kerala-state-data-center).

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TRL has 5 years of experience in hosting TRL Software products in State Data Centres in India. Mobile apps hosted in this model are used by 1000+ State Government users.

4.1.3.6 *Other Infrastructure Requirements*

In addition to the hardware/software requirements mentioned in the previous section, there are some other infrastructure-related requirements to be furnished before deploying the iROADS application in KSTP environment. The details of these requirements are kept below.

4.1.3.6.0.1 Public IP Address

iROADS application is supposed to be hosted in an internet environment. Hence, it is required to assign a public IP to both the staging and production application servers. The database servers do not require a public IP and not recommended to expose into the internet.

4.1.3.6.0.2 SSL Certificate

It is recommended to host the iROADS application with SSL. As iROADS application suite contains multiple loosely coupled applications, each application should be hosted with SSL certificate. Hence, it is recommended to go for a wild card certificate for all the sub-domains rather than a single certificate for each sub-domain.

The wild card certificate should be installed in both staging and production servers so that all applications (staging and production) shall be available in HTTPS environment. Responsibility of procuring SSL certificate for both staging and production server shall lie with KSTP.

4.1.3.6.0.3 Domain Names

Considering we have a number of sub-domains to be created under this domain name which can be done through DNS manager option within the domain provider site. The following table details the name of the sub-domain expected for production as well as staging instance of iROADS application suite.

Sl	Sub Domain Name	Environment	IP	Remarks

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#	Sub Domain Name	Environment	IP	Remarks
1	iroadsstaging	Staging	<Public IP of the Staging Server>	Authentication application
2	commonapistaging	Staging	<Public IP of the Staging Server>	Authentication API services
3	iroadsapistaging	Staging	<Public IP of the Staging Server>	iROADS API services
4	iroadswebstaging	Staging	<Public IP of the Staging Server>	iROADS module (Client UI)
5	gisproxystaging	Staging	<Public IP of the Staging Server>	Proxy service handler for GIS services
6	gisservicesstaging	Staging	<Public IP of the Staging Server>	GIS API services
7	gisstaging	Staging	<Public IP of the Staging Server>	GIS Server
8	iroads	Production	<Public IP of the Production Server>	Authentication application
9	commonapi	Production	<Public IP of the Production Server>	Authentication API services
10	iroadsapi	Production	<Public IP of the Production Server>	iROADS API services
11	iroadsweb	Production	<Public IP of the Production Server>	iROADS module (Client UI)
12	gisproxy	Production	<Public IP of the Production Server>	Proxy service handler for GIS services
13	gisservices	Production	<Public IP of the Production Server>	GIS API services
14	gis	Production	<Public IP of the	GIS Server

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#	Sub Domain Name	Environment	IP	Remarks
			Production Server>	

4.1.3.6.0.4 SMTP Configuration Details

iROADS system requires the SMTP configuration details to perform the following features within iROADS.

- Sending the account creation mail while creating a new user account
- For resetting the password, when a user forgets their account password.

Hence the following information to be provided for configuring the SMTP service within iROADS application.

- An email account for the iROADS application (preferably iroadssupport@<your domain name>) and its password.
- The email SMTP server IP or domain name.
- The SMTP port details.

The SMTP port has to be enabled in the application server and it is the responsibility of KSTP to make sure the application server can communicate with the SMTP service.

4.1.3.7 Security Considerations

The following are the list of security considerations considered while the iROADS system architecture.

4.1.3.7.0.1 Data Encryption

Most of the sensitive data (Email, Phone Number, etc.) shall be kept encrypted and stored in the database. The data will be decrypted and shown in its right form within the application. This ensures the sensitive data is not exposed outside of the application.

Similarly, the sensitive information is shared between client and server application in the encrypted format only. Also, it is always recommended to host the application in SSL environment so that the transport layer is encrypted always.

4.1.3.7.0.2 Authentication

As explained earlier, the main business logic is implemented in the backend systems (Web APIs). The data is stored behind this backend system and are accessible only through this Web APIs. Hence, it is important to restrict the access to these APIs only to authenticated

clients. Different authentication schemes (Custom, LDAP, Oauth2, etc.) can be integrated to the framework to ensure the identity of the request. Only authenticated requests are allowed to access the application resources. There will be a unique 'Client ID' assigned to each client application that access these Web APIs. Any requests coming to these backend systems without a valid Client ID will receive an unauthorized access (Status code 401).

4.1.3.7.0.3 Authorization

Even after authentication, each API request will be going through an Authorization routine to ensure the authenticated user does have the appropriate privilege for accessing the resource. Once authenticated, the API application will be providing a unique token for the client. This token will be used to identify the access privilege of the user who is accessing the application resource. Each API request will be having this token in addition to the Client ID. Based on the token, the system identifies the privileges of the user and verify whether the user have access to the requested resource and processing the request further.

4.1.3.7.0.4 OWASP Considerations

The proposed architecture will try to cover the current top 10 security problems addressed by open web application security project (OWASP). Moreover, as the primary concern, Shell web application is always preferred to be hosted in an HTTPS environment. This will make sure that all information transported from client to server and vice versa are encrypted and secure.

4.1.3.7.0.5 Injections

According to OWASP, any web application hosted over internet could be vulnerable to injection attacks including SQL Injection, AD Injection etc. In order to avoid such kind of attacks, the architecture will make sure that all inputs from the end user will be validated and special characters are escaped with proper notations.

4.1.3.7.0.6 Broken Authentications

Incomplete authentications or authorizations can lead to security attacks. In order to avoid them in the framework, Shell application shall not include authentication logic. This will be done by the Common Authentication application which is already behind the firewall. Shell shall not execute any authentication by itself. Shell shall internally invoke APIs of the Common Authentication application for authentication. Therefore, Session ID or any relevant access credential related details shall never be made available in URL or cookie. Only a security token will be transferred between each HTTP request through HTTP headers. Since all such business logic is kept in a common authentication application, which is already

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behind a protected network, it prevents such attacks. This follows the recommended approach by OWASP to prevent these types of attacks.

The architecture will also leave provision for two factor authentication via e-mail or SMS. Such add-on features to add more security. Moreover, all authentication mechanisms will be based on Microsoft Identity, which is a new Authentication framework based on OWIN standards. Web APIs exposed by shell shall comply with OWASP's ESAPI standards too.

4.1.3.7.0.7 Cross Site Scripting Attack (XSS)

All web applications that use JavaScript on their client side can be vulnerable to XSS if proper security measures are not taken. In order to prevent XSS, the proposed application framework will encode all user inputs properly to place them into any DOM object or any model or controllers in the client side. Adding escape sequences before placing them to HTML DOM is the recommended model by OWASP for prevention of XSS. It translates all user inputs, so that special characters in the user input will be treated as normal character by the script engine. The architecture will make sure that it uses HTTP only cookies, so that cookies will not be accessible via JavaScript.

4.1.3.7.0.8 Direct Object Reference

Direct Object Reference attack is observed when an object like images, documents, videos or files are exposed as URL without proper authorization. This will be prevented in the proposed architecture in two ways.

- The business injection framework (BIF) already prevents the direct access of any resource without authorization.
- Properly authorize all object access before they are delivered through the Common Authentication application. Every request coming to the business applications shall be validated for the availability of authorized token before serving the request.

4.1.3.7.0.9 Security Misconfiguration

This security vulnerability is observed when configuration information related to database or any of such confidential resource are exposed to internet by mistake. In order to avoid such possibility in the proposed architecture, the shell never keeps any application configuration details. These configurations are kept in the application for the business module of each product individually and they are kept behind the Shell. In this case, Shell will act as an initial checkpoint and protect the business modules from any kind of such attacks. Moreover, each business module will keep such sensitive information encrypted and secure.

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4.1.3.7.0.10 Sensitive Data Exposure

The proposed architecture makes sure that sensitive information is not exposed to internet directly. Even any entity models in Business modules will not go to the client side as it is. Rather, they will be mapped to a client object where sensitive information is properly encrypted. In the database, they are kept as encrypted.

4.1.3.7.0.11 Function Level Access Control

If the user has some knowledge of the URL for accessing the administrative page, he can access the administrative page even if the page is not properly authorised based on the user role. In the system architecture, we have role based authorisation in the controller actions and UI levels. Each role in the application shall be associated with pre-defined set of access privileges for each page in the application. So, when a request comes in, the framework verifies whether the user does have the privilege to access this page based on the access privileges configured for the role of the user. This verification will prevent function level access control attack.

4.1.3.7.0.12 Cross site request forgery (XSRF)

XSRF is one of the most observed security vulnerability that was first observed 4-5 years ago. Now Microsoft has their own mechanism to prevent this kind of attack, by generating an anti-forgery token and including them with each request. The architecture will follow this mechanism to prevent such attacks.

4.1.3.7.0.13 Using components with Vulnerabilities

The framework shall make sure that all libraries and components are updated with latest stable releases. All third party libraries will be upgraded to the latest whenever some new stable upgrade releases.

4.1.3.7.0.14 Redirects and Forwards

Any resource or services of the business modules are accessed only after proper authorization of the request. A known decision is taken and passed to the development and implementation team not to use redirection in the code, unless required. If in case any redirection is required, it is also ensured that the framework does not accept any user input which will be used for redirection.

4.1.3.7.0.15 Security Audits on Third Party Components Used

Third party tools will be audited on each major release of the application for any vulnerability issues and if there are any security updates available for these tools, they will

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be updated in the application. This activity shall ensure that the latest stability, security, and performance improvements in these tools are readily made available in the application. However, if there are any breaking changes in the tools, that will not be updated in the product.

4.1.4 TRL's Training Expertise

The following section summarises TRL's expertise in Institutional Strengthening and training.

4.1.4.1 Institutional Strengthening and Training

TRL's expertise has been used in over 60 countries worldwide to develop appropriate and cost effective solutions. Our experience in institutional strengthening and training helps customers develop their own expertise, making their solutions sustainable and tailored to local circumstances. Our work continues to enable government customers to set standards for highway and vehicle design, formulate policies on road safety, transport and the environment, and encourage good traffic engineering practice. The organisation also sells its services to other customers in the UK and overseas, providing fundamental and applied research, working as a contractor, consultant or providing facilities and staff. These customers include local and regional authorities, major civil engineering contractors, transport operators, consultants, industry, foreign governments and international aid agencies.

The scope of training and technology transfer is driven by Customer requirements and the particular objectives of the project. Our capability includes the design and delivery of off-the-shelf courses or tailor made courses, on-the-job training and training within industry or at further education centres. Both this and a larger institutional strengthening component are seen as integral to successful project completion and the development of a sustainable local capacity.

4.1.4.2 HDM-4 Training

The HDM-4 training courses we undertake are usually one week in duration, comprising formal presentations, demonstrations and exercises in all the HDM-4 functionalities, with the focus on 'hands-on' training. The formal presentations comprise PowerPoint presentations that provide background information on HDM-4 functionalities. The demonstrations involve the trainer running HDM-4 to demonstrate how to use each functionality.

We strongly believe that the greatest benefit in such a training course is for the trainees to get 'hands-on' experience in using HDM-4 rather than simply watching an experienced HDM-4 trainer demonstrating its use. Therefore, we provide exercises for the trainees so that they become confident in using the various functionalities in HDM-4. In order for the

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trainees to be able to undertake the exercises, HDM-4 training licences need to be installed on their computers for the duration of the course.

The topics that are covered in the training include:

- Configuration for local conditions
- Creating Vehicle Fleets
- Creating Road Networks
- Creating Work Standards
- Conducting Project Analysis
- Conducting Programme Analysis
- Conducting Strategy Analysis
- Calibration of Road Deterioration and Vehicle Operating Cost relationships



Figure 4-54 : HDM4 Training from TRI

TRL provides HDMGlobal certified training on HDM-4. Greg Morosuik is TRL representative on the HDMGlobal board, who have been awarded the concession for the development and management of HDM-4 version 2. The above photo shows Greg Morosuik with a team of engineering practitioners from around the globe after a HDM-4 training course at TRL.

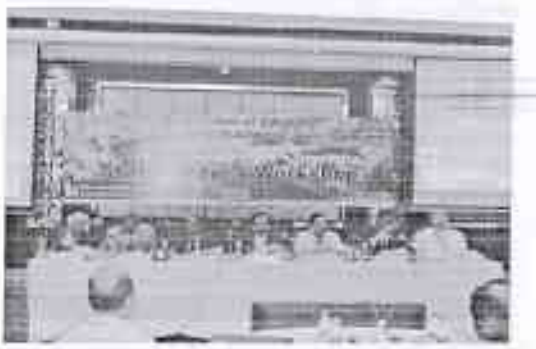
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Tony Mathew, Team Leader of this project, leading a Workshop on Road Asset Management Project in Tanzania



Tony Mather leading Asset Management Stakeholders Workshop – Bhubaneswar, Odisha




Tony Mathew leading Group of Maintenance Management Experts Meeting, Management of Asian Highways, UNESCAP, Bangkok

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4.1.4.3 *Trainings Summary from a successful crash data system implementation project.*

TRL was chosen by HPSRP to deliver a key project which aims to bring international best practice in collecting, managing, analysing and using road crash data with the assistance from the UK's TRL Limited. TRL is a global centre of excellence in road safety and is a leader in helping countries to reduce crash rates scientifically. The project is using TRL's proven innovative accident data management solution called 'iMAAP'. 'iMAAP' has been customised specifically for Himachal Pradesh and implemented in the State for this project called 'HP RADMS'. 'iMAAP' provides the latest techniques in crash data storage, analysis and reporting. Its tools for identifying and analysing the causes of crashes are sophisticated but simple to use which really improves its effectiveness since staff can be effective without major training

The project team had delivered 60+ training programs on crash data collection, analysis and road safety trainings to various stakeholders. There are approximately around 1500+ people were trained so far. This includes class room trainings, on-the-job trainings and site visit trainings.

- 70+ man days of dedicated training delivered to various stakeholders
- 20 crash data collection trainings at 14 different districts to around 650 participants involving police, highway engineers and PWD staff.
- 50 refresher trainings on iMAAP web and mobile application to approximately 500 participants during the support and maintenance period.
- 20 road safety trainings to 300 participants at various districts by TRL Experts during the support and maintenance period.

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Figure 4-55 : Field data collection trainings using TRL mobile apps provided by TRL in India

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4.2 Item by Item Commentary on the Technical Requirements

This section elaborates on the Consultants compliance with the technical requirements, as per the compliance needs mentioned in Section VI Technical Requirements – Page 172 – Section 1.2 - 'Item-by-Item Commentary on the Technical Requirements'.

It provides an item by item commentary on the technical requirements with the 'Level of Compliance' and 'Details of Compliance' with the cross references to the relevant information in other sections of this document.

4.2.1 Technical Responsiveness Checklist

The Technical Responsiveness Checklist given in the following paragraph describes the compliance level of the proposed system against each requirement. Cross references to the relevant supporting information are also included against each requirement.

This section is added to provide adequate details as requested in the RFP requirement mentioned in Section VI Technical Requirements – G. Technical Responsiveness Checklist in Page 174.

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Tech. Require. No. 1	Technical Requirement: *The proposed RIS&RMMS system shall be web based client server architecture*	***Mandatory***

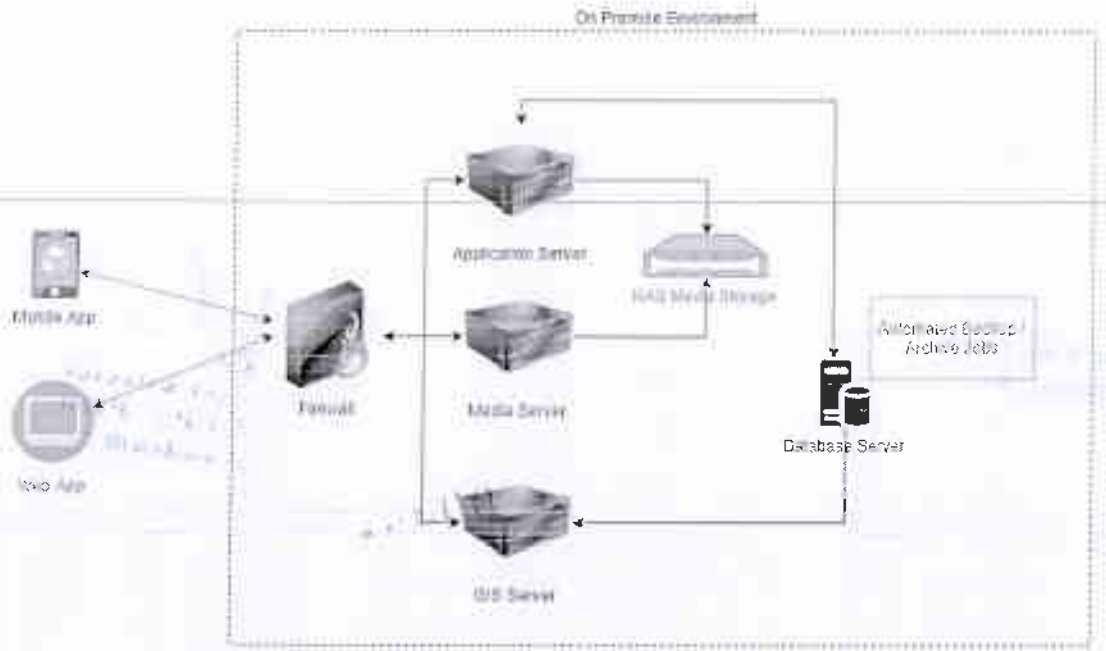
Bidder's technical reasons supporting compliance:

We are compliant with this requirement.

iROADS from TRL is a GIS-based custom off the shelf asset management system which was widely used across the Globe. The current version of the iROADS application, which complies with all the functional requirements specified in the functional requirements section of the RFP document, can be implemented in a client/server architecture, allowing the clients/customers to access the application using the standard web browsers. As a part of the product roadmap of iROADS, TRL has progressed quite well into the re-engineering of the application into the latest web based technologies as outlined in 'Section 4.1.3 - Technical Architecture of the system' of this report. For this particular project, the latest version of the iROADS application will be provided.

Bidder's cross references to supporting information in Technical Bid:

The iROADS system is developed using latest web based technologies and follows web based client server architecture. The application can be deployed in Windows or Linux servers. The technical architecture diagram of the iROADS system is given below.



Please refer 'Section 4.1.3 - Technical Architecture of the system' of this report for more

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details about the proposed system architecture.

Tech. Require. No. 2	Technical Requirement: *The whole system architecture shall be easily customizable or modifiable Module based with facility for adding new modules*	***Mandatory***
Bidder's technical reasons supporting compliance: We are compliant with this requirement. The technical architecture of the proposed web-based system offers the ability to easily customise the existing modules and add new modules into the system by software developers with right skills and capabilities.		
Bidder's cross references to supporting information in Technical Bid: The iROADS architecture is designed in such a way that the architecture can be easily Customisable or modifiable with an ability to add new modules at a later point in time . Each independent business components can be developed as individual modules and can be deployed into different containers so as we can scale individual modules or add any new modules as required. The system architecture supports to add or modify features/modules specific to each implementation. For example, it is possible to extend the set of standard reports specific to an implementation. The data extraction, processing and reporting logic can be isolated to pluggable modules, so that the set of standard reports can be extended without modifying the base business module. Please refer 'Pluggable Implementation Specific Modules' sub-heading in 'Section 4.1.3.3 - Advantages of the architecture' for more details.		

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Tech. Require. No. 3	Technical Requirement: *Capability of data interchange using web service architecture to other external software systems like PWD's PRICE software*	***Mandatory***

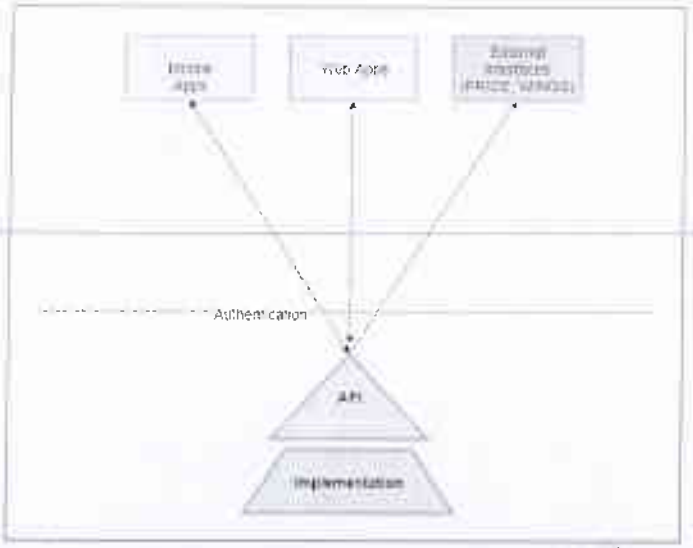
Bidder's technical reasons supporting compliance:

We are compliant with this requirement.

The proposed system uses the RESTful Web API based web services as the preferred medium for data interchange between the external systems and the proposed system. The web services exposed by the proposed system needs every web service request to be authenticated first. Each web service request shall have an authentication token to provide the actual response of the requested web service. The structure of the RESTful web service for interchanging the data with PWD's PRICE and WINGS software systems can be discussed and agreed during the customisation phase.

Bidder's cross references to supporting information in Technical Bid:

The proposed system uses the RESTful Web API based web services as the preferred medium for data interchange between the external systems and the proposed system. The 'API Strategy' diagram below explains our approach in interfacing with external systems using the RESTful Web API based web services.



Please refer 'RESTful Web API based web services for integration' sub-heading in 'Section 4.1.3.3 - Advantages of the architecture' for more details.

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Tech. Require. No. 4	Technical Requirement: *Contains facilities or modules for RIS, TIS, RMMS, Bridge & culvert information system, HDM-4 output generation and capability for using other pavement management systems, analysis tools and simple decision tree logic*	***Mandatory***

Bidder's technical reasons supporting compliance:

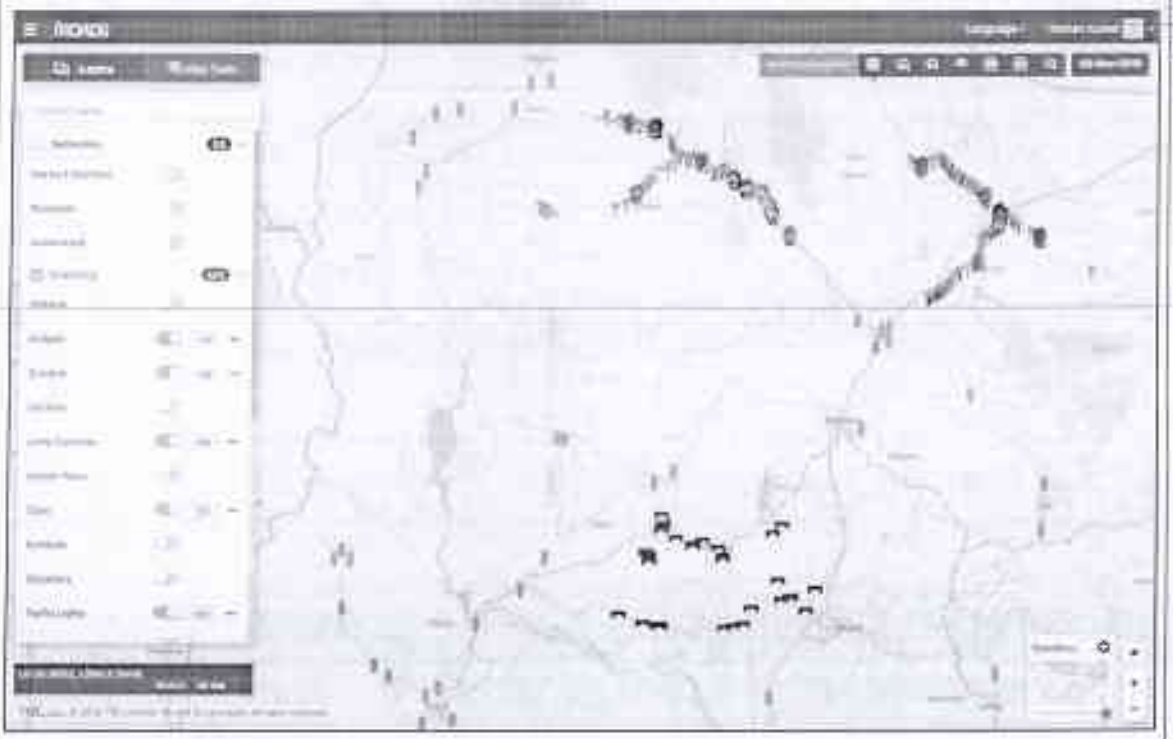
We are compliant with this requirement.

iROADS has dedicated modules for RIS, TIS, RMMS, Bridge Information System. iROADS has inbuilt functionality to export data to an HDM-4 workspace. The wizard that exists guides a user through the steps needed to select the data sources and to homogenise the data.

Bidder's cross references to supporting information in Technical Bid:

Road Information System:

The Road Information System (RIS) of the iROADS allows for the upload and storage of inventory data (with user defined attributes for each element as well as other information records such as images or PDF documents) and condition data captured through planned, routine and/or unplanned inspection records.



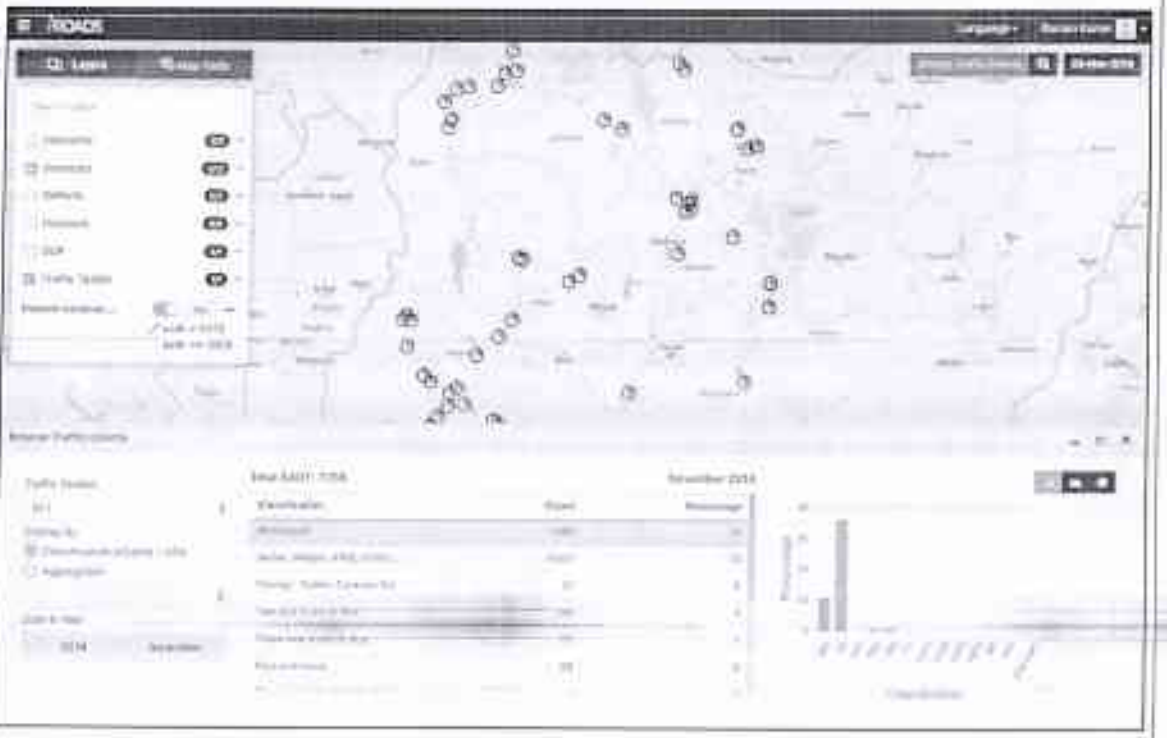
Please refer 'Section 4.1.1.1 - Road Information System' for more details and capabilities of the Road Information System.

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Traffic Information System:

The Traffic Toolkit in iROADS allows the import, processing and display of traffic data, primarily traffic count data (but also axle load data) for use throughout iROADS. The Traffic Toolkit provides a bespoke home for detailed traffic data to be stored.



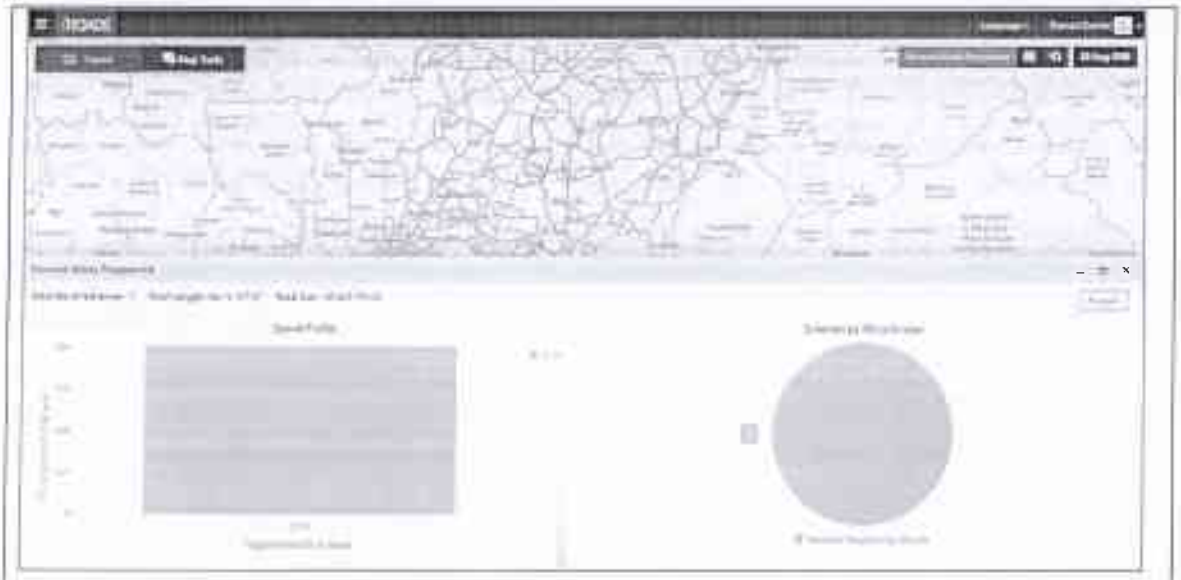
Please refer 'Section 4.1.1.2 - Traffic Information System' for more details about the capabilities of the Traffic Information System.

Road Maintenance and Management System:

iROADS will generate multi-year maintenance work programmes for each asset group and identify the annual (routine maintenance) elements of work. The maintenance plans for the individual asset groups will then be integrated where feasible to provide suitable maintenance projects. The multi-year work programmes will be aligned with external systems (e.g. utilities) to create the maintenance plan for all asset types.

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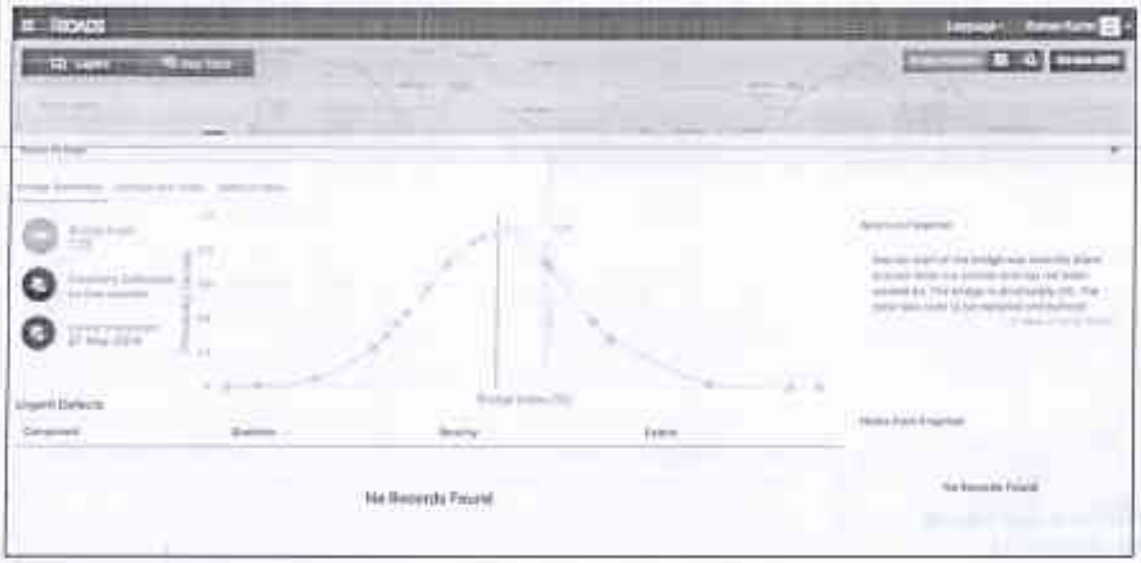
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Please refer 'Section 4.1.1.3 - Pavement Management System (PMS),' Section 7.1.1.4 - Lifecycle Management System, Section 4.1.1.5 - Routine Maintenance and Management System' for more details about the RMMS system and its capabilities.

Bridge and Culvert Information System:

The Bridge and Culvert Information System (BIS) module of iROADS allows for user configurable routine and principal inspection data to be stored against each inventory element and other relevant information (as images and PDF documents) to be attached to those inspections. The inspection data can be used to derive functional and structural performance indices for each bridge.

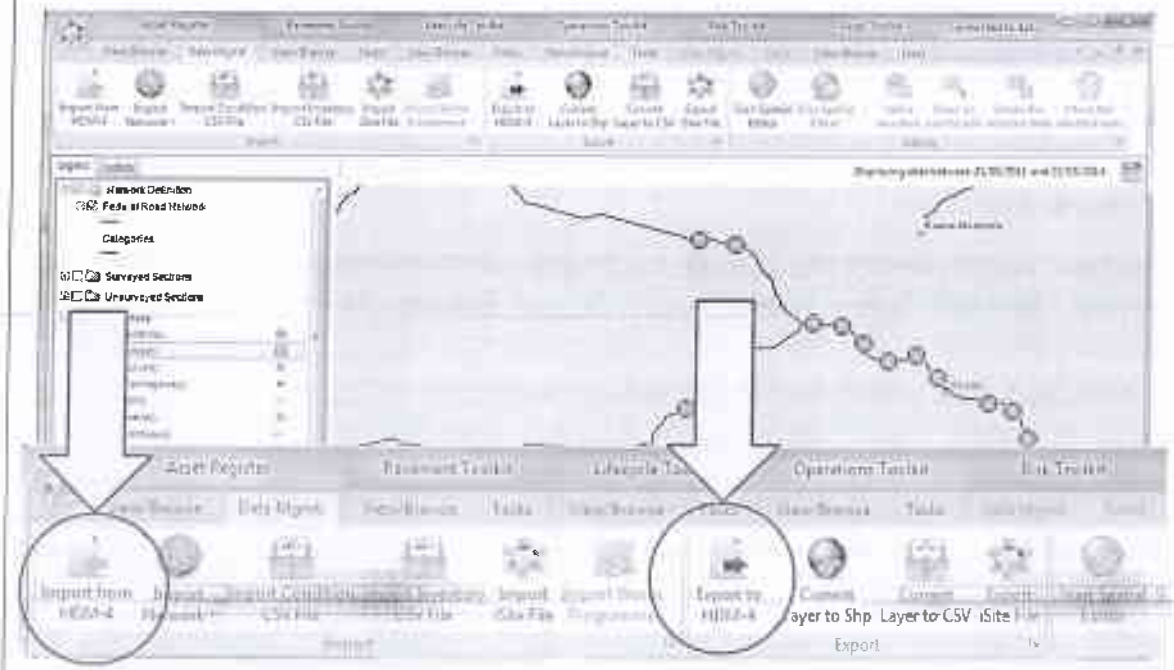


Please refer 'Section 4.1.1.6 - Bridge and Culvert Information System' for more details and capabilities about the Bridge and Culvert Information System.

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HDM-4 Integration:

iROADS has inbuilt functionality to export data to an HDM-4 workspace. The wizard guides a user through the steps needed to select the data sources and how they want to homogenise the data. The process creates lengths of homogenous data based on the surveyed condition data stored in iROADS. This process can be carried out for a whole network, an individual road section or any length in-between.



Please refer 'Section 4.1.1.7 - iROADS and HDM-4' for the integration details with HDM4.

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Tech. Require. No. 5	Technical Requirement: *capability of importing and using data from automated survey vehicles in all available standard formats*	***Mandatory***
Bidder's technical reasons supporting compliance: We are compliant with this requirement. iROADS has the ability to store inventory and condition data regarding other assets such as signs, road markings, street lighting, safety barriers, urban furniture, as well as other linear or discrete asset types. The Road Information System (RIS) of the iROADS allows for the upload and storage of inventory data (with user defined attributes for each element as well as other information records such as images or PDF documents) and condition data captured through planned, routine and/or unplanned inspection records in HMDIF standard format or similar.		
Bidder's cross references to supporting information in Technical Bid: The Pavement Management System (PMS) component of iROADS is capable of importing, storing and using pavement inventory and condition data, taken from multiple surveys over multiple years. The condition data can be imported to the system using standard HMDIF format or similar formats, using a pre-defined CSV template. The system can use the uploaded condition to project future condition through user defined deterioration profiles, define treatments and effects of treatments, and generate forward works programmes with associated maintenance budgets.		

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Please refer 'Section 4.1.1.3 - Pavement Management System' to know more details about the capabilities of the Road Information System.

Tech. Require. No. 6	Technical Requirement: *Whether the proposed system is fully in compliance with the minimum functional requirements specified in the Technical specification*	*Mandatory*

Bidder's technical reasons supporting compliance:

We are compliant with this requirement.

iROADS from TRL is a GIS-based custom off the shelf asset management system which was widely used across the Globe. iROADS application will comply with all the functional requirements specified in the functional requirements section of the RFP document, allowing the clients/customers to access the application using the web browsers.

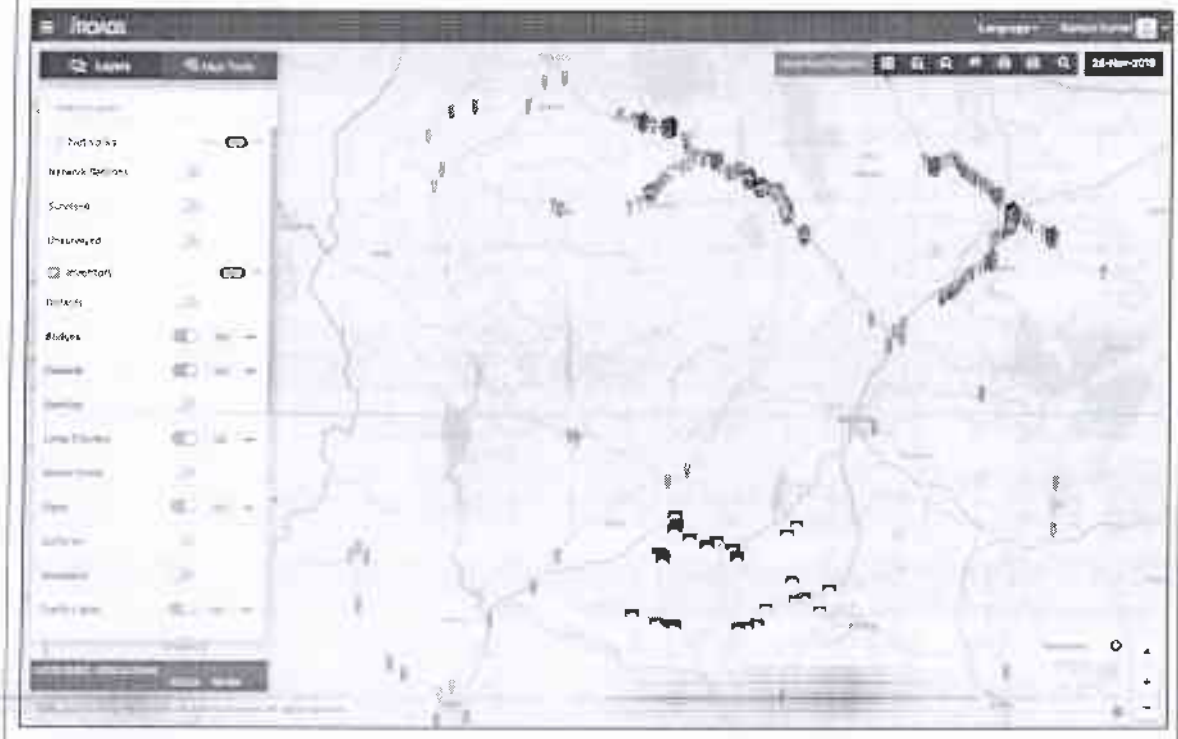
Bidder's cross references to supporting information in Technical Bid:

The iROADS system will comply with all the functional requirements specified in the functional requirements section of the RFP document, allowing the clients/customers to access the application using the web browsers. The summary of the key features available in the system below.

Road Information System:

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The Road Information System (RIS) of the iROADS allows for the upload and storage of inventory data (with user defined attributes for each element as well as other information records such as images or PDF documents) and condition data captured through planned, routine and/or unplanned inspection records.



Please refer 'Section 4.1.1.1 - Road Information System' for more details and capabilities of the Road Information System.

Traffic Information System:

The Traffic Toolkit in iROADS allows the import, processing and display of traffic data, primarily traffic count data (but also axle load data) for use throughout iROADS. The Traffic Toolkit provides a bespoke home for detailed traffic data to be stored.

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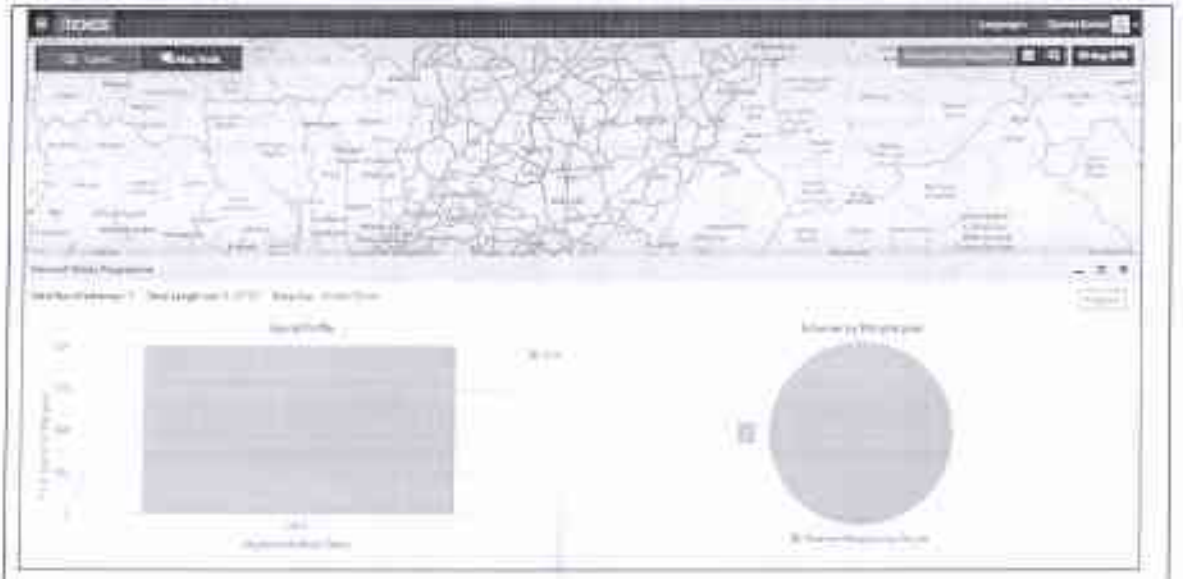
Please refer 'Section 4.1.1.2 - Traffic Information System' for more details about the capabilities of the Traffic Information System.

Road Maintenance and Management System:

iROADS will generate multi-year maintenance work programmes for each asset group and identify the annual (routine maintenance) elements of work. The maintenance plans for the individual asset groups will then be integrated where feasible to provide suitable maintenance projects. The multi-year work programmes will be aligned with external systems (e.g. utilities) to create the maintenance plan for all asset types.

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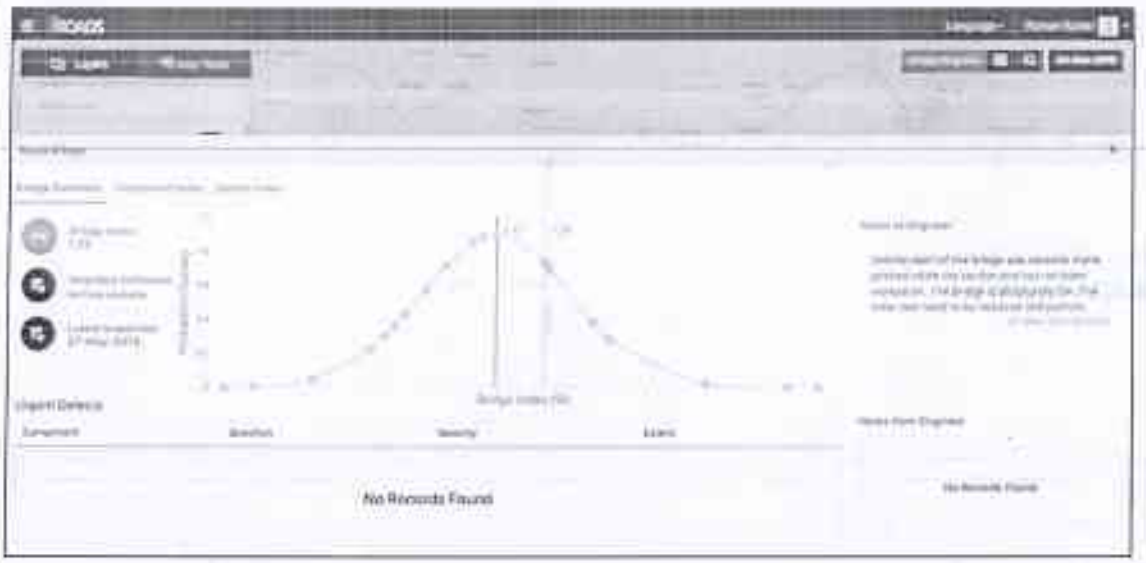
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Please refer 'Section 4.1.1.3 - Pavement Management System (PMS),' Section 7.1.1.4 - Lifecycle Management System, Section 4.1.1.5 - Routine Maintenance and Management System' for more details about the RMMS system and its capabilities.

Bridge and Culvert Information System:

The Bridge and Culvert Information System (BIS) module of iROADS allows for user configurable routine and principal inspection data to be stored against each inventory element and other relevant information (as images and PDF documents) to be attached to those inspections. The inspection data can be used to derive functional and structural performance indices for each bridge.



Please refer 'Section 4.1.1.6 - Bridge and Culvert Information System' for more details and capabilities about the Bridge and Culvert Information System.

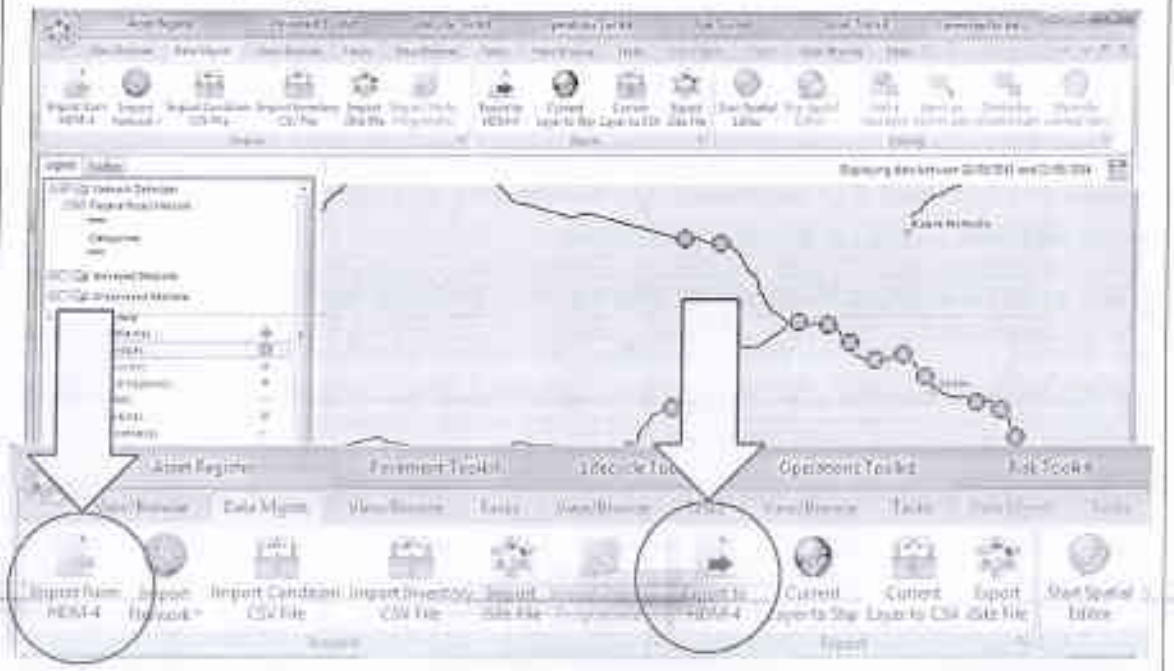
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HDM-4 Integration:

iROADS has inbuilt functionality to export data to an HDM-4 workspace. The wizard guides a user through the steps needed to select the data sources and how they want to homogenise the data. The process creates lengths of homogenous data based on the surveyed condition data stored in iROADS. This process can be carried out for a whole network, an individual road section or any length in-between.



Please refer 'Section 4.1.1.7 - iROADS and HDM-4' for the integration details with HDM4.

In addition to this, the Consultant team had prepared a compliance table based on the functional requirements specified in the sub-section 'D. Functional Requirements' of 'Section VI. Technical Requirements' in the RFP. . The compliance level of iROADS system against each requirement in that specific section can be found in 'Section 4.2.2 - Functional Requirements Compliance Table'.

The Consultant team had prepared a compliance table based on the functional requirements specified as functions and sub-sections in Page number – 166 of the RFP. The compliance level of iROADS system against each requirement in that specific section can be found in 'Section 4.2.3 - Function & Sub-function Level Compliance Table'.

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Tech. Require. No. 7	Technical Requirement: *Whether the proposed system has the ability for graphical and GIS based visualization of all types of data and availability of various types of analytical and modelling tools*	***Mandatory***

Bidder's technical reasons supporting compliance:

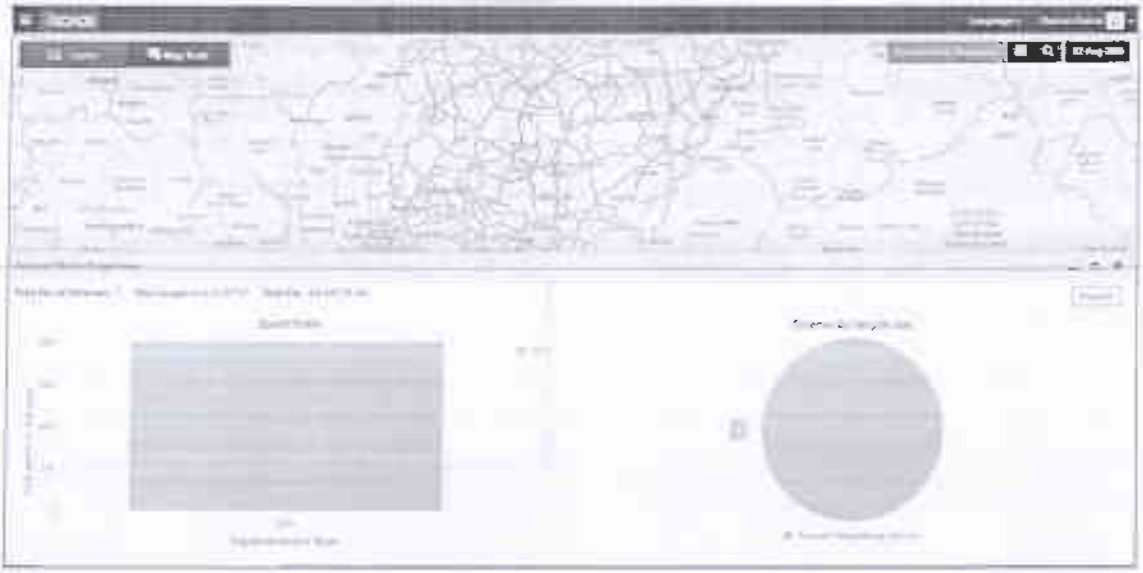
We are compliant with this requirement.

Yes, the iROADS system has the ability to show the traffic count data, condition data, network data etc. in graphical format. The system has advanced GIS capabilities and analytical tools in-built. The network data, condition data uploaded and the analysis outputs can be displayed on the GIS interface with details.

Bidder's cross references to supporting information in Technical Bid:

The iROADS system has the ability to display the data in graphical and GIS formats. The analytical tools allows the users to project the condition of the network, and assist the users in identifying the annual work programs etc.

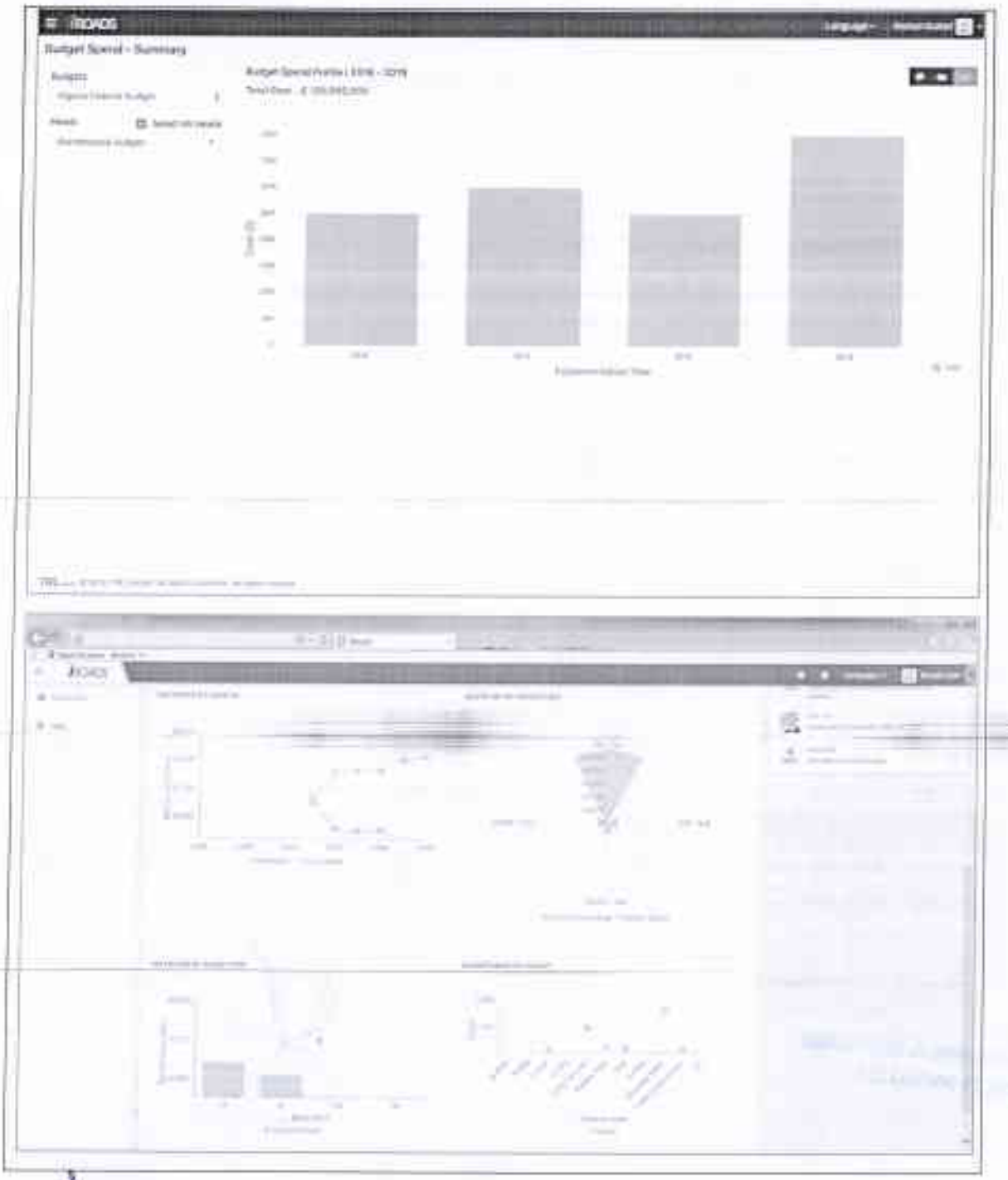
The screenshot below shows the 'Forward Works Programme' identified using the analysis tools within the iROADS system. The schemes can be viewed in the GIS interface and the other scheme related information can be viewed using the graphical charts.



The data available in the system can be displayed and analysed using different visualisations.

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Tech. Require. No. 8	Technical Requirement: *ability to receive and use various types of climatic and environmental data concerned with road asset management*	***Mandatory***
Bidder's technical reasons supporting compliance: We are compliant with this requirement. As specified in the response to the pre-bid queries, Question Number – 29, the climatic and environmental data can be imported and displayed on the GIS interface provided the data is given in standard GIS formats. The iROADS system has the ability to import the climatic and environmental data concerned with road asset management if the data is available in standard GIS formats such as ESRI Shapefiles (or) the data available/shared through the live web service links. The system can import and show the climatic and environmental layers and display them on the GIS interface.		
Bidder's cross references to supporting information in Technical Bid: The iROADS system has the ability receive, store and use the environmental, climate and emission data. The emission data stored within the system shall be used viewing and querying purposes. The screenshot below shows the 'Air Quality Management Areas' identified within the UK, by different local authorities after reviewing and assessing of air quality in their area. This task involves the measurement of current pollution values and predict the future pollution through emission models.		

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'Transport Enhancement Emission Modelling' system, which is another proprietary software from TRL can be used for developing emission models and projecting the future emission rates/trends by combining vehicle fleet, speed flow and traffic flow data. The emission projections results can be plotted on the GIS interface and can be viewed as graphical charts.



Please refer 'Section 4.1.1.8 - Environmental/Climate/Emission data and models' for more details.

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Tech. Require. No. 9	Technical Requirement: *ability to take, visualize and use data from android/iOS mobile apps efficiently and effectively*	***Mandatory***
Bidder's technical reasons supporting compliance: We are compliant with this requirement. The mobile applications are developed in such way that it works online (with internet connectivity) and offline (without internet connectivity) for collecting the data. The data collected using the mobile application will be synchronised with the central server using the internet connectivity. This information will flow into the web application and can be used for reporting, analysis and actions.		
Bidder's cross references to supporting information in Technical Bid: The data collected using the mobile application can be visualised and analysed using the web application. The infrastructure team uses the Dynamic Cone Penetrometer (DCP) data collection mobile application to collect the penetration data from the test site. The data collected using the mobile application will be synced with the web application using the internet connectivity available in the mobile device.		

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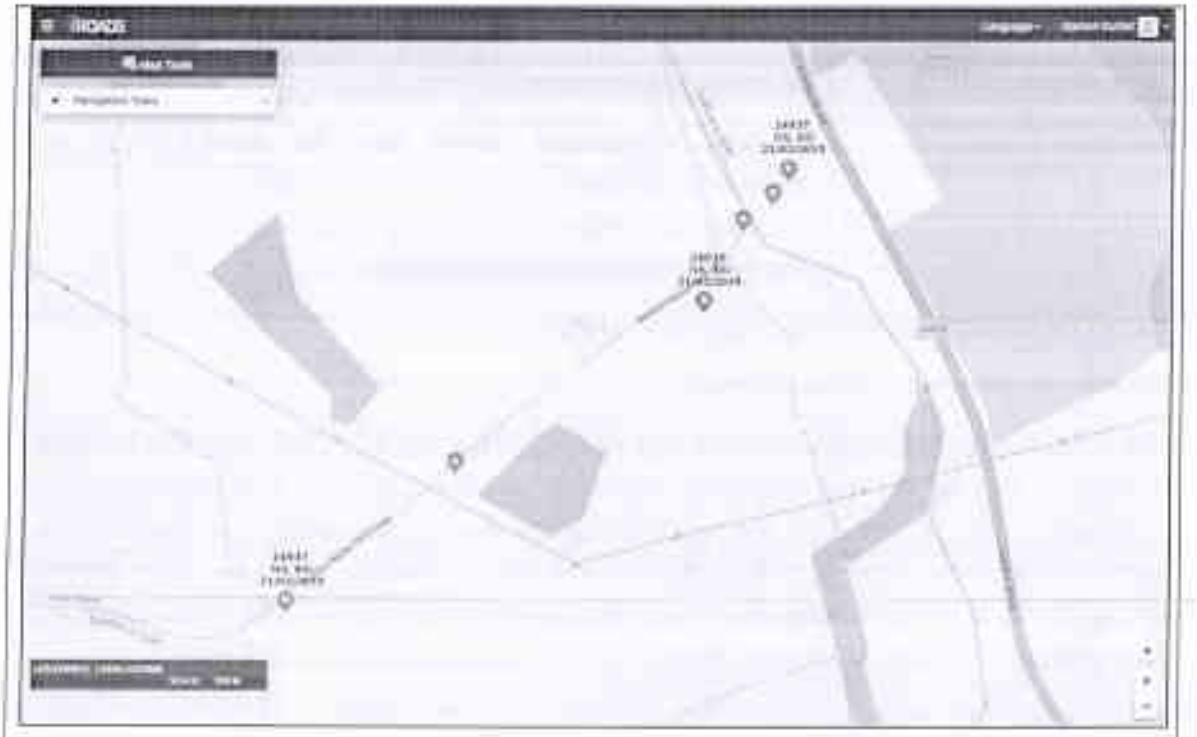
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The data analysis team uses the web application to pull out reports from the data/export the data at any point of time using TRL's iROADS web application. The screenshot below shows the test sites where the iRODS DCP mobile application is used for collecting the data.

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The data can be viewed, analysed and downloaded from the web application.



Please refer 'Section 4.1.2 – Field Data Collection Mobile Applications from TRL' of this document for more details about the technical architecture of the proposed web based system.

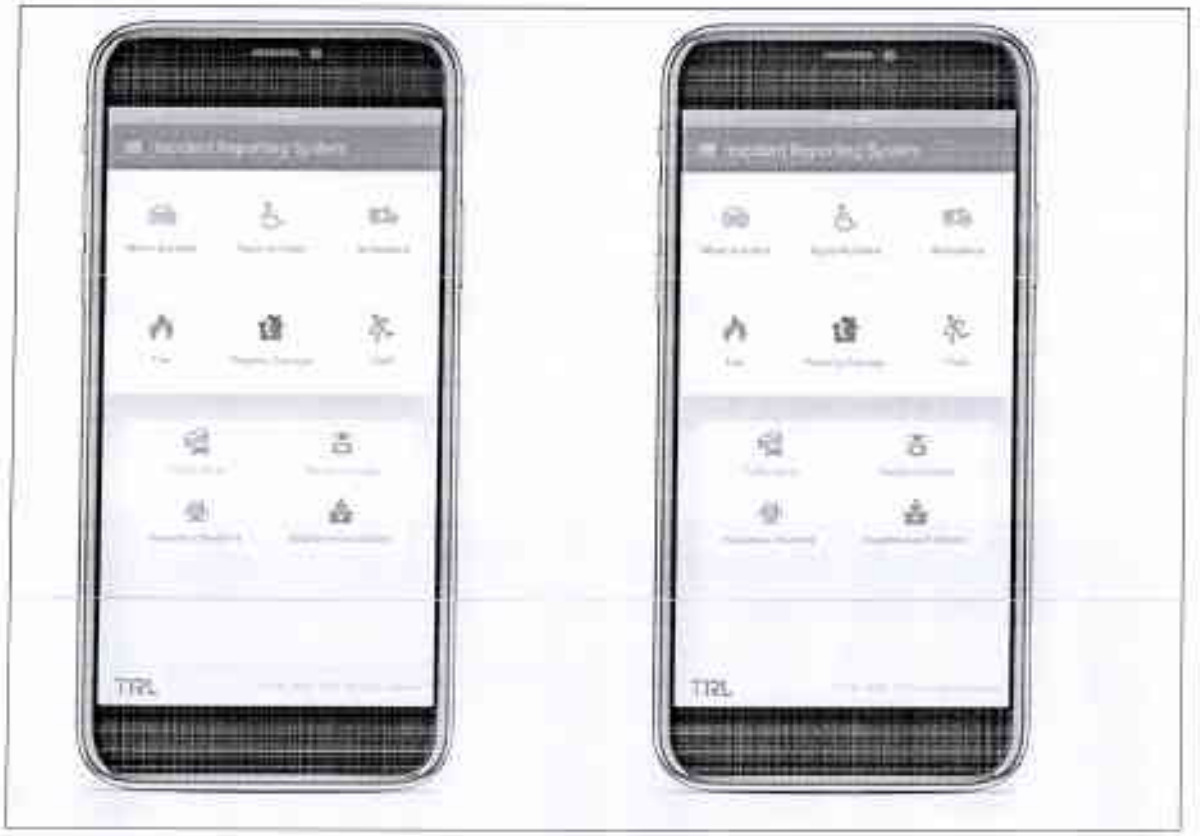
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Tech. Require. No. 10	Technical Requirement: *Provision of general mobile app for asset information for public with facility for complaints reporting in conformity with the requirements vide Task-2 of technical specifications*	***Mandatory***
Bidder's technical reasons supporting compliance: We are compliant with this requirement. The Consultant had already developed mobile applications for field data collection for asset and safety. The mobile applications works in sync with the respective web applications for syncing the data to and from the server using the internet connectivity available in the mobile application. This mobile application can be customized based on client specific requirements to capture complaints reporting by the general public. This information will flow into the web application and can be used for reporting, analysis and actions.		
Bidder's cross references to supporting information in Technical Bid: The public facing mobile application developed by the Consultant allows the general public to report various incidents, emergencies, property/asset damages using the mobile application. The capabilities of the mobile application support reporting of road traffic crashes, reporting of asset damages related to the road traffic crashes and receive traffic alerts etc. Please refer 'Section 4.1.2.5 - Public Facing Mobile Application' of this document to know more details.		

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Tech. Require. No. 11	Technical Requirement: *Provision of field inspection mobile apps for asset information and data collection for PWD Employees in conformity with the requirements vide Task-3 of technical specifications*	*Mandatory*

Bidder's technical reasons supporting compliance:

We are compliant with this requirement.

The Consultant had already developed dedicated mobile applications for field data collection. The mobile applications works in sync with the respective web applications for syncing the data to and from the server using the internet connectivity available in the mobile application.

This mobile application can be customized based on client specific requirements to allow the PWD engineers for asset information and data collection. This information will flow into the web application and can be used for reporting, analysis and actions.

Bidder's cross references to supporting information in Technical Bid:

The Survey data collection mobile application from TRL was used by the survey data

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collection team, field engineers for conducting and uploading the survey data directly from the survey sites/locations. The capabilities of the mobile application include,

- > Capability to Search, List, and modify the existing surveys
- > Create new survey Forms
- > Clone existing survey forms
- > Safety Analysts, Engineers shall create multiple surveys using the templates created by the admin
- > Search, and list active surveys
- > See the details of a specific survey



Please refer 'Section 4.1.2.2 – Survey Data Collection Mobile Application', 'Section 4.1.2.2 – Safety Audit Data Collection Mobile Application', 'Section 4.1.2.4 – Mobile Asset Data Management Solution 'iCAPTURE'' of this document to know more details about the data collection mobile applications developed by the Consultant.

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Tech. Require. No. 12	Technical Requirement: *usage of open source platforms for web servers, GIS servers and database management systems*	*Preferred*

Bidder's technical reasons supporting compliance:

We are compliant with this requirement.

The technical framework of the proposed system was designed using open-source platforms. The well-studied implementation of open-source based technology stack in enterprise grade software product allows the clients to realise the advantages of cost, agility, freedom, flexibility and speed of adoption. The list of open source tools used in the product architecture. The iROADS system is developed using 100% open source technologies and tools. Hence, there is no on-going additional license costs for the client.

- Ubuntu for Operating System
- Geo Server as the GIS Sever
- PostgreSQL as the preferred database
- .NET Core as the back-end framework
- Angular 8 as the front end framework
- Nginx as the Web server

Bidder's cross references to supporting information in Technical Bid:

The list of components used in the framework is listed below.

#	Hardware Component	Technology	Licensing Model
1	Presentation Layer	Angular 8, HTML5, CSS3, Bootstrap	Open Source Technologies
2	API Layer	RESTful Web APIs	Open Source Technologies
3	GIS Service Layer	GDAL, Python, GeoServer, Flask	Open Source Technologies & Software
4	Application Backend Layer	ASP.Net Core 3.x, Node JS 8.x	Open Source Technologies
5	Data Access Layer	Entity Framework Core 3.x	Open Source Technology
6	Database Layer	PostgreSQL 12.x	Open Source Software
7	Charting/Reporting	Wijmo Enterprise / DevXtreme / Stimulsoft Reports	3rd party libraries. No additional licensing requirements.
8	Video Streaming	Universal Media Server	Open Source Software

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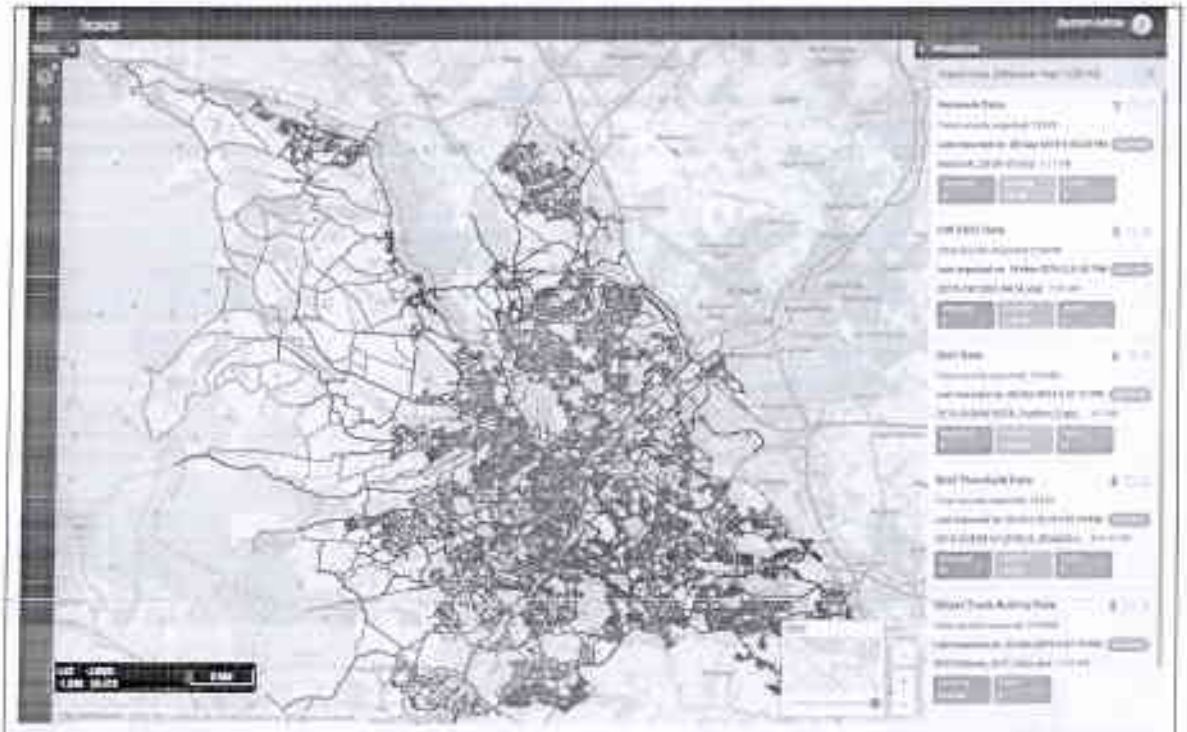
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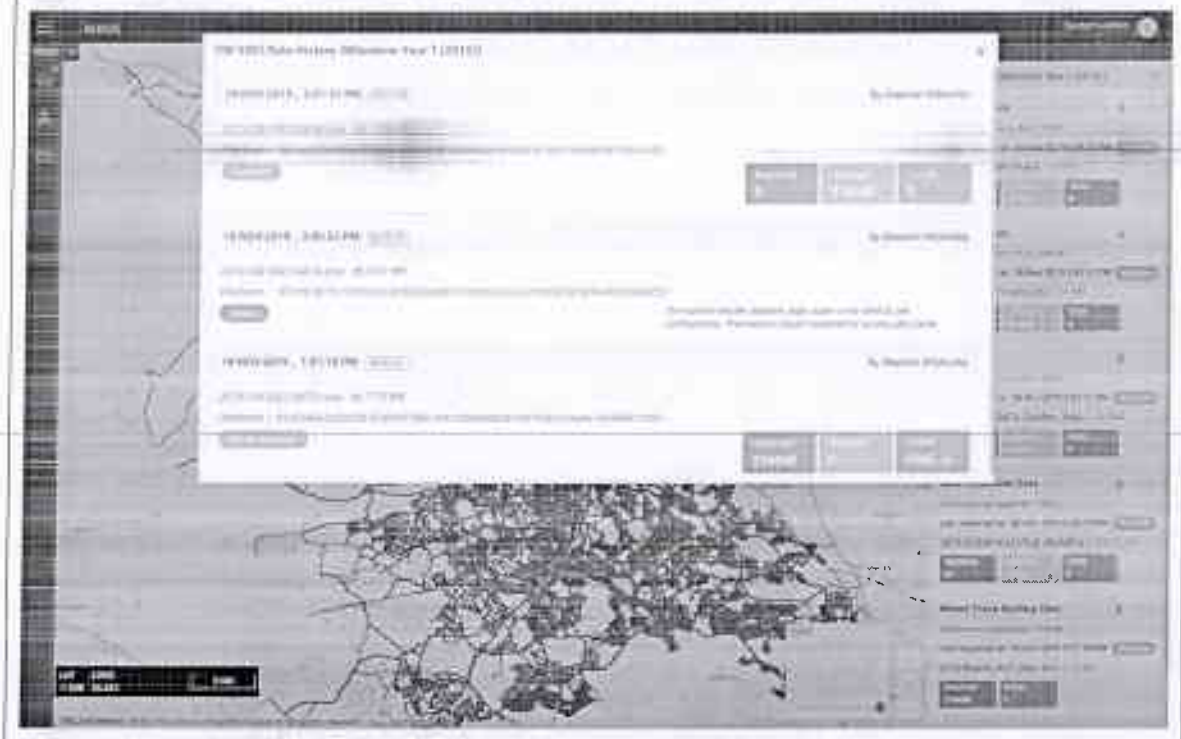
Please refer 'Section 4.1.3.2 – Technology Stack' for more details about the technical architecture of the proposed web based system.

Tech. Require. No. 13	Technical Requirement: *Provisions for data handling capabilities and speed of processing digital data and streaming digital content such as photos, videos, drone data etc*	***Preferred***
Bidder's technical reasons supporting compliance: We are compliant with this requirement. The architecture of the system considers the capability of the system to store and stream different video files on-demand with high speed. Considering this requirement, the architecture of the system recommends to have the digital media stored in a network attached storage (NAS) device and use a media server application to stream this digital media.		
Bidder's cross references to supporting information in Technical Bid: The system can handle large of volume network, condition and GIS data and process the data within desired time for uploading and processing the data. The screenshots below shows an example for the large volume of the data processed by the system. The condition data with hundreds of thousand data rows, accounting to few megabytes file size were imported using the system's in-built import utility within acceptable time frame.		

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The digital media contents such as photos and videos can be viewed within the system using system's digital content viewer feature. The screenshot below shows an asset data being viewed using the viewer feature in the system.

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Please refer 'Section 4.1.3.3.0.3 – Streaming Digital Data' for more details about the technical architecture of the proposed web based system.

Tech. Require. No. 14	Technical Requirement: *Data archiving capability and efficiency*	*Mandatory*

Bidder's technical reasons supporting compliance:

We are compliant with this requirement.

Data archiving and backup is an important capability built in the system. Since the application to be hosted in a on-premise data centre, this capability needs to be manually provided in the database server. For archiving, there shall be a scheduler job written which can archive the data from the database to a network storage space. The schedule for the job can be controlled by configuration parameters. These configuration can be when to archive the data, what data to be archived etc.

Bidder's cross references to supporting information in Technical Bid:

Please refer 'Section 4.1.3.3.0.4 – Data Archiving and Backup Capability' for more details about the technical architecture of the proposed web based system.

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Tech. Require. No. 15	Technical Requirement: *Integration and management of mobile apps with the central RMMS database with detailed report*	***Mandatory***

Bidder's technical reasons supporting compliance:

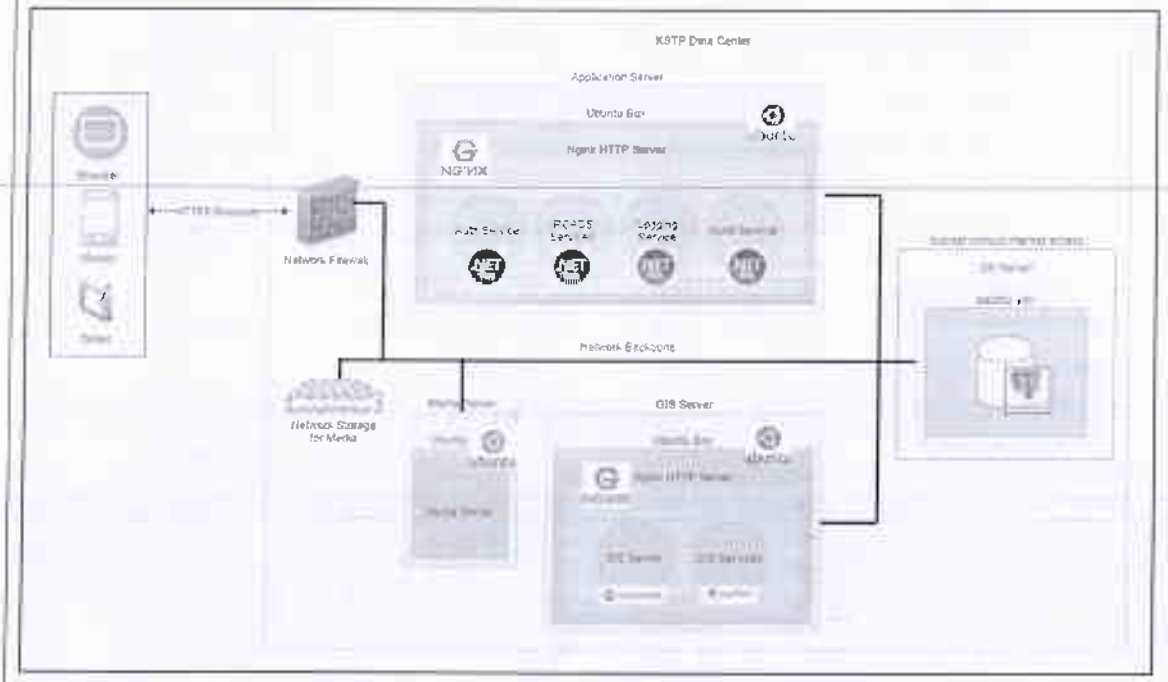
We are compliant with this requirement.

As per the architecture design of the proposed system, the mobile applications always consume RESTful web services exposed by the web application/component of the proposed system. New REST End points shall be created to access the RMMS database from the web application component of the proposed system and these shall be consumed by the mobile application.

The Consultant had already developed dedicated mobile applications for field data collection. The mobile applications works in sync with the respective web applications for syncing the data to and from the server using the internet connectivity available in the mobile application. These mobile applications can be customised based on KSTP requirements. This information will flow into the web application and can be used for reporting, analysis and actions.

Bidder's cross references to supporting information in Technical Bid:

The architecture design of the proposed system and how mobile applications interact with the central web application and RMMS database is highlighted in the diagram given below.



Please refer 'Section 4.1.3.3.0.5 – Integration and management of mobile apps with the

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central RMMS database for more details about the technical architecture of the proposed web based system.

Tech. Require. No. 16	Technical Requirement: *Licensing requirements of all third party software and submission of detailed plan of such licensing requirements and costs for the five year warranty period and three year additional period (in compliance of Task-4)*	***Mandatory***

Bidder's technical reasons supporting compliance:

We are compliant with this requirement. The iROADS system is developed using 100% open source technologies and tools. Hence, there is no on-going additional license costs for the client.

The proposed system uses third party visualisation libraries like Wijmo, DevXtreme, Stimulsoft Reports, Universal Media Server and GeoServer, which were used during the product development. There are no specific licensing requirements for the client to use these services, since the libraries were used for product development purposes only.

Bidder's cross references to supporting information in Technical Bid:

The licensing requirements of all third party software used in the system architecture can be found in the table below.

#	Hardware Component	Technology	Licensing Model
1	Presentation Layer	Angular 8, HTML5, CSS3, Bootstrap	Open Source Technologies
2	API Layer	RESTful Web APIs	Open Source Technologies
3	GIS Service Layer	GDAL, Python, GeoServer, Flask	Open Source Technologies & Software
4	Application Backend Layer	ASP.Net Core 3.x, Node JS 8.x	Open Source Technologies
5	Data Access Layer	Entity Framework Core 3.x	Open Source Technology
6	Database Layer	PostgreSQL 12.x	Open Source Software
7	Charting/Reporting	Wijmo Enterprise / DevXtreme / Stimulsoft Reports	3rd party libraries, No additional licensing requirements.
8	Video Streaming	Universal Media Server	Open Source Software

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Please refer 'Section 4.1.3.2 – Technology Stack' for more details about the technical architecture of the proposed web based system.

Tech. Require. No. 17	Technical Requirement: *Compliance of requirements given in Task 5,6,7 and 8 in the Technical specifications with willingness to abide with or any conditions or suggestions put forward*	***Preferred***

Bidder's technical reasons supporting compliance:

We are compliant with the requirements in Tasks 5, 6, 7 and 8.

Task 5 – Infrastructure assessment report and requirements to be handed over to the client. All infrastructure as per requirements to be procured and readied by the client. The Consultant's team will require flexible access to the environments (physical) for installation and hosting of the software. Physical hardware installations at the State Data Center or similar hosting arrangements are to be taken care by the client, but we will support in case if any assistance is required.

Task 6 – Technical assistance for integrating and harmonising the RMMS system and HDM4 will be provided by the project team.

Task 7 – Necessary training to the designated departmental staff in software systems shall be provided. As soon as the hosting is complete, the project team will make arrangements for training of engineers working with Kerala PWD Roads Division, who will be responsible for road maintenance and for staff in the PWD E-Governance Cell. The number of trainees is estimated up to six hundred. Trainings will be done in batches, the ideal batch being up to 30 in number. A complete training schedule along with training materials will be prepared and submitted for approval by PWD Roads Division. The trainings will be conducted in all the four circles and Head Office of PWD. The trainings will only commence after receiving the approval of the client. In particular, selected engineers in PWD E-Governance Cell will be imparted training on configuration and customization of the RMMS Software. Training will be scheduled in such a way that the initial round of training covering the engineering staff of PWD Roads and E-Governance Cell will be completed in the Year 1 of the maintenance period. Thereafter, training will be imparted to up to 30 PWD staff (1 training session) every year, depending on the demand for training.

Task 8 – The Software support will be provided in the normal working hours. All references to the hours in the RFP are considered as working hours. Support is provided / quoted for support during working hours only. Only tasks and responsibilities related to the software product and its configurations in the hosting environment can be taken care by the Consultant. Any issues arising due to infrastructure, hosting, communication etc. at the SDC

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shall not be supported by the Consultant since these activities are completely managed by SDC team. On-line chat support can be provided over a communication tool like Skype or Slack during working hours only. Please refer 'Section 4.4.5 - Software Support and Maintenance' The PRICE and WINGS software shall be interfaced with the RIS & RMMS system via RESTful API services. The RIS & RMMS system shall have an option to import the GIS data using the shape file format. All patches or updates to fix any defects in the product raised by the customer shall be tested and released to the client environment. Any enhancements or changes required in the system shall go through the change management process as mentioned in 'Section 4.4.7 - Change management (CR) / new features.
Bidder's cross references to supporting information in Technical Bid: Please refer 'Section 4.4.2 - Software Customisation and Hosting of the application in the SDC Staging arrangement'. Please refer 'Section 4.4.3 - Activity 3 - Training and User Manual Preparation and Submission for more details. Please refer 'Section 4.4.5 - Software Support and Maintenance' for more details regarding the scope of the support and maintenance services offered.

Tech. Require. No. 18	Technical Requirement: *whether the costing for support during the first five year period and the next three year period is given with reasonable explanations and manpower requirements*	***mandatory***
Bidder's technical reasons supporting compliance: Yes, the costing for support during the first five year period and the next three year period is given with reasonable explanations and manpower requirements.		
Bidder's cross references to supporting information in Technical Bid: Please refer the pricing summary of this proposal document for cost details. The scope of the software support maintenance can be found in 'Section 4.4.5.1 – Scope of Software Support'.		

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4.2.2 *Functional Requirements Compliance Table*

The following table lists the functional requirements specified in the sub-section 'D. Functional Requirements' of 'Section VI. Technical Requirements' in the RFP. We also marked the compliance level of iROADS system against each requirement.

RFP Ref no	Description	Compliant					Details of Compliance
		Fully Functional	Customisable	Partial Compliance	Not Available	Not Sure	
a)	**Terminology:** All Screen Labels, Menu Items, and Reports should be configurable to the Client conventions in English.	√					The Screen Labels, Menu Items, and Reports can be configured in English.
b)	**Network Referencing:** The RIS & RMMS should support different network referencing schemes. These should include the linear distance from the start of the road section, linear distance from the start of a road, as well as distance from known location reference points.	√					The iROADS system support different network referencing schemes such as linear referencing, Spatial referencing etc.
c)	**Cross-Sectional Positioning:** The RIS & RMMS should support different cross-sectional positional models, to enable data to be referenced laterally to a location on a road	√					The iROADS system allows the users to configure different cross-sectional position values (XSP) and associate the XSP's with road sections and various assets.

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RFP Ref no	Description	Compliant					Details of Compliance
		Fully Functional	Customisable	Partial Compliance	Not Available	Not Sure	
	section, in terms of lanes, shoulders, ditches, verges etc.						
d)	**Network Coding Rules:** The RAMS should enforce the Client's Network Numbering rules, by performing data validation on entry or through some other form of the internal validation procedure.		√				The iROADS system has an inbuilt standard data validations. The rules shall be customised to enforce the client's network numbering rules and other rules during the data entry.
e)	Network Editing: The RIS & RMMS should permit splitting and joining of road sections, and modification of road section lengths, while preserving integrity of all current and historical data stored against the affected sections.	√					The iROADS system supports the splitting and merging of road sections, changing attributes of the section. Any changes made to the attributes are stored in the system.
f)	Network Auditing: The RIS & RMMS should audit all changes to the road network definition, and allow review of those changes. The audit should record the date and time of network	√					iROADS has an inbuilt audit trail module which tracks all the changes made to the data in the system. The details of the old value, new value, the date & time when the change is made and the person

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RFP Ref no	Description	Compliant					Details of Compliance
		Fully Functional	Customisable	Partial Compliance	Not Available	Not Sure	
	change, the nature of the change, and the username of the person who made the change.						who made the change are tracked and can be viewed using the audit trail module.
g)	User-defined Data Items, Functionalities and Processes: The RIS & RMMS should be configurable to enable the user to define additional types of inventory and condition data to be stored, and to define what attributes are to be stored against each type of inventory. There should be no restriction on the number and type of items or their attributes, other than physical limitations of the database management system being used. The RIS & RMMS must have user-definable data entry forms, including labels in the local language so that the user does not	√					The iROADS system supports the creation of user defined attributes specific to different inventory items. The system does not limit the number of additional fields that can be added. However, it is suggested to identify all the required attributes at the early stage and configure it in the system.

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RFP Ref no	Description	Compliant					Details of Compliance
		Fully Functional	Customisable	Partial Compliance	Not Available	Not Sure	
	need to use a table view for entering new types of data.						
h)	Historical Data: The RIS & RMMS should allow the storage of data over different time periods, to enable comparison of data over time. There should be the functionality to view/select the most current data.	√					The iROADS system allows the storage of the condition data for different time periods. The system provides an option for the user to choose the condition data based on a particular time period and use it for analyses.
i)	Multi-Media Data: The RIS & RMMS should enable management and display of multi-media objects (e.g. photographs, video etc.) as attributes of inventory items. For video, the RIS & RMMS should allow viewing of video data by chainage along the road section, based on frame/ Chainage lookup tables supplied. The GIS should display the multi-media objects in the correct spatial location, and the	√					The iROADS system allows the users to upload photo, videos against the network and inventory items as attachments. The uploaded photos and videos can be displayed in the application along with the road section.

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RFP Ref no	Description	Compliant					Details of Compliance
		Fully Functional	Customisable	Partial Compliance	Not Available	Not Sure	
	images should be accessible by selecting them in the GIS.						
j)	Data-level Security: The RIS & RMMS should permit security setup so that user may have different security privileges for sub-networks in different geographical or administrative areas. It should permit setup so that different users have different levels of access for different types of data.	√					The iROADS system has an inbuilt user role management which allows the administrator users to setup different level of access for different users within the system. The access limitations can be setup application features level and sub-network/administrative area levels.
k)	Functional-Level Security: The RIS & RMMS should permit security setup so that different users may have access to different application modules and functions of these modules.	√					The iROADS system has an inbuilt user role management which allows the administrator users to setup different level of access for different users within the system.
l)	Flexible Reporting: The RIS & RMMS should provide flexible reporting to enable Department staff to devise their own		√				The iROADS system has in-built standard reports for producing reports based the network and condition data etc. The reports required for

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RFP Ref no	Description	Compliant					Details of Compliance
		Fully Functional	Customisable	Partial Compliance	Not Available	Not Sure	
	reports and to make those reports available to other users. Reporting of all items in the RIS & RMMS database must be permitted, including reporting on user-defined items and attributes, comparisons of current data with historical data, audit records etc. Export to a spreadsheet and/or comma-delimited text files should also be provided. The Bidder should also provide details of any interfaces to third-party reporting tools.						KSTP shall be customised in the system after capturing the requirements from the KSTP team.
m)	Dynamic Sub-Sectioning: The RIS & RMMS should provide a dynamic sub-sectioning capability that allows sub-sections of homogeneous characteristics to be generated and reported upon. This should allow combination of all types		V				The IRUADS system has an inbuilt functionality which allows the users to create dynamic sub sections based on the network data and condition data stored in the system. The system shall be customised to include any other additional parameters

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RFP Ref no	Description	Compliant					Details of Compliance
		Fully Functional	Customisable	Partial Compliance	Not Available	Not Sure	
	of data stored in the system. The RIS & RMMS should allow parameters to be specified for minimum length of sub-section, and also threshold changes in value at which new sub-sections should be created.						required other than the general parameters used for sub-sectioning.
n)	Schematic Line Diagrams: The RIS & RMMS should enable production of schematic line diagrams and/or strip-maps annotated with any data stored in the RIS & RMMS.	√					The iROADS system allow the production of schematic line diagrams and/or strip-maps annotated with any data stored in the system.
o)	**Integration with GIS or any other open freely available platform:** The RIS & RMMS should integrate with the Client's GIS, Google maps or any other open freely available platform.	√					The iROADS system uses the 'Open Street Map' from 'Open Layers' as the default map within the product. However, the application has the capability to integrate the GIS maps available with the client. If the Google maps license is procured by the client, it can be integrated with the RIS & RMMS system.

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RFP Ref no	Description	Compliant					Details of Compliance
		Fully Functional	Customisable	Partial Compliance	Not Available	Not Sure	
o - i)	From the RIS & RMMS, while reviewing a particular road section, the user should be able to view and highlight that road section in the GIS. The interface should highlight if there is any missing GIS representation for a given road section.	√					The iROADS system highlights the road selected by the user in the GIS and can display information regarding the selected road section.
o - ii)	Selected attributes of the road section, as stored in the RIS & RMMS, should be able to be viewed from the GIS, used as screen labels, and be available for thematic mapping. These attributes should include all section-wide attributes including section identifier, road identifier, the defined direction of the section, road classification, IRI, PCI etc.		√				The iROADS system can display information regarding the selected road section. The attributes that needs to be displayed can be discussed and agreed with the client.
o - iii)	The GIS interface should be able to display dynamically segmented data from the RIS & RMMS. This	√					The display of survey condition data is displayed at the granularity collected.

RFP Ref no	Description	Compliant					Details of Compliance
		Fully Functional	Customisable	Partial Compliance	Not Available	Not Sure	
	means that any data stored in the RIS & RMMS that varies by length along the road section can be correctly displayed in the GIS.						
o - iv)	The GIS interface should be able to view all background GIS data held in the client's GIS database	√					The data held in the client's GIS database can be imported into iROADS system and displayed in the iROADS GIS interface.
p)	Climate and Disaster related data management Environmental/Climate related data:- The system shall take environmental factors such as humidity, temperature and rainfall into account while predicting the deterioration and future condition of the road. The model or modeling engine must accept the data and predicted values from the relevant authorities such as the Meteorological		√				As specified in the response to the pre-bid queries, Question Number – 29, the climatic and environmental data can be imported and displayed on the GIS interface provided the data is given in standard GIS formats.

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RFP Ref no	Description	Compliant					Details of Compliance
		Fully Functional	Customisable	Partial Compliance	Not Available	Not Sure	
	Department (IMD), Centre for Earth Sciences etc in any format. • Modeling engine for HDM4 or any advanced models should be configured to allow environmental factors in the modeling parameters set; • The factors must include forecasted humidity, rainfall and temperature; • Historical and projected data must be displayed on graphs and GIS maps. <u>Disaster related data & management:-</u> The roads are arterial to help people or transport to a safer location when the disaster is forecasted or happens. In these unfortunate events						

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RFP Ref no	Description	Compliant					Details of Compliance
		Fully Functional	Customisable	Partial Compliance	Not Available	Not Sure	
	having the dataflow in place and sending information to the right authorities is the key. The system should provide the following features to help in taking the necessary steps by providing the right information: • Show the historical and forecasted information on the GIS maps; • show historical data on the disaster and the impact that caused; • Send SMS/email alerts to Divisional Authorities when the forecasted information is available from the relevant departments • Identify the worst affected areas/roads in case the disaster like flood, landslides etc happens and						

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RFP Ref no	Description	Compliant					Details of Compliance
		Fully Functional	Customisable	Partial Compliance	Not Available	Not Sure	
	suggest alternative routes using GIS maps; • Provide special inspection forms (in mobile application also) to inspect the roads after a disaster such as floods, earthquakes, under slips and over slips taken place; • The data from the special inspection forms needs to be escalated to the right authorities immediately and show the information on the GIS map. This information could trigger alternative routes if the data indicates the road closures due to a disaster.						
q	**HDM-4 Interface/Non-HDM4 models:** The RIS & RMMS should interface with **HDM-4** (the Highway		√				The iROADS has the ability to import/export the data in HDM4 format. As clarified in the pre-bid response to

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RFP Ref no	Description	Compliant					Details of Compliance
		Fully Functional	Customisable	Partial Compliance	Not Available	Not Sure	
	Development and Management Tools), or any other Non-HDM4 models.						the question number 30, the non-HDM-4 models which can be used in this project shall be decided later and the system can be customised to include those.
q – i)	An automatic sectioning function to create 'homogeneous' sections for analysis based on inventory and condition data;	√					The 'Export to HDM4' feature in iROADS system allows the automatic sectioning function to create 'homogeneous' sections for analysis based on inventory and condition data.
q – ii)	A generic interface which allows the user to define the rules for the above- mentioned automatic sectioning. This can include specification of which data items to use, what transformations to apply to the individual data items (i.e. average, minimum, maximum, dominant, weighted average), minimum and	√					The 'Export to HDM4' feature in iROADS system allows the users to define the rules and mappings while preparing the data in the format required for HDM4 analyses.

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RFP Ref no	Description	Compliant					Details of Compliance
		Fully Functional	Customisable	Partial Compliance	Not Available	Not Sure	
	maximum lengths of sections etc.;						
q – iii)	An interface to import the modeling segments if those were defined elsewhere;	√					The iROADS has the ability to import/export the data in HDM4 format.
q – iv)	Fully configurable modeling parameters, treatment types, budgets and along with define rules of the treatment triggers;	√					The 'Export to HDM4' feature in iROADS system allows the users to define the rules and mappings while preparing the data in the format required for HDM4 analyses.
q – v)	Ability to configure advanced and modern modeling techniques by using Machine Learning (Artificial Intelligence) algorithms;				√		This feature is currently not available in the product and it shall be developed for this project. The requirements shall be discussed and detailed out during the requirements phase.
q – vi)	Preparation of HDM-4 Input files for Work Standards, Traffic Classification and Growth Rates;	√					The 'Export to HDM4' feature in iROADS system allows the users to prepare the data in the format required for the different HDM4 based analyses.

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RFP Ref no	Description	Compliant					Details of Compliance
		Fully Functional	Customisable	Partial Compliance	Not Available	Not Sure	
q – vii)	Averaging and Preparation of data for Strategy Analysis as well as Program Analysis;	√					The 'Export to HDM4' feature in iROADS system allows the users to prepare the data in the format required for the different HDM4 based analyses.
q – viii)	Import of the results of the works program generated by HDM-4 (if the external HDM-4 Software does the modeling) so that they can be related to the real road network and displayed in tabular or map-based reports. Depending on how complex the system is and what it is intended for, this may also require the RAMS retaining a copy of the road network definition passed to HDM-4 , so that if any changes occur to that network between the time of passing the data and getting the results, then they do not prevent the	√					The iROADS has the ability to import/export the data in HDM4 format.

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RFP Ref no	Description	Compliant					Details of Compliance
		Fully Functional	Customisable	Partial Compliance	Not Available	Not Sure	
	results being imported.						

4.2.3 Function & Sub-function level Compliance Table

The following table lists the functional requirements specified as functions and sub-sections in Page number – 166 of the RFP. The compliance level of iROADS system against each requirement is marked in the table.

Function	Sub-Function	Compliant					Details of Compliance
		Fully Functional	Customisable	Partial Compliance	Not Available	Not Sure	
4.2.3.1	*User Management and Access Control*						
User Creation	Get list of Users from State Single Sign On (SSO) facility		V				The iROADS system supports the integration with SSO facility. The system has a built-in SSO feature using Microsoft Identity Server and Active Directory. The system shall be customised to work with the SSO facility available with the customer.
	Alternatively Create users	V					The iROADS system

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Function	Sub-Function	Compliant					Details of Compliance
		Fully Functional	Customisable	Partial Compliance	Not Available	Not Sure	
	with password						has an inbuilt user account management module using which the administrative users can create new users with passwords.
	Entry/Edit/Update user information Using Form	V					The iROADS system has an inbuilt user account management module using which the administrative users can create/edit/manage the user accounts in the system.
	Assign/Remove Jurisdiction		V				The iROADS system has an inbuilt user account management module which shall be customised to include the jurisdiction field. The users with adequate privilege can assign/remove jurisdiction for a particular user.
	Assign/Remove Roles	V					The iROADS system has an inbuilt user account management module using which the administrative users can

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Function	Sub-Function	Compliant					Details of Compliance
		Fully Functional	Customisable	Partial Compliance	Not Available	Not Sure	
							assign/remove roles for a particular user.
	View/Print Users list		√				All the user accounts created in the system shall be listed in the user account management module. The system allows the users to export the user list in spread sheet format. The system shall be customised to include the capability to print the user list.
	Reset password for all users	√					The system shall allow the administrative users to reset the password for other users in the system.
Jurisdiction Creation and Management	Define Circles , Divisions, Sub-divisions and Section offices, Define Employee cadre, post and designations		√				The iROADS system has a master data management screen using which allows the users to create master data required for the system. This feature shall be customised to include the ability to define circles, divisions, sub-divisions, section

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Function	Sub-Function	Compliant					Details of Compliance
		Fully Functional	Customisable	Partial Compliance	Not Available	Not Sure	
							offices, employee post and designations etc.
	Define asset classifications based on the type of asset	√					The iROADS system has a master data management screen using which the administrative users can define the asset classifications for the different types of asset.
	Define other master data required for system running	√					The iROADS system has a master data management screen using which the administrative users can create the different master data required for running the system.
	Edit/Update Data	√					The system allows the users with adequate privileges to edit and update the data.
	View/Report data		√				The system allows the users with adequate privileges to view and produce reports based on the data. The exact report formats shall be

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Function	Sub-Function	Compliant					Details of Compliance
		Fully Functional	Customisable	Partial Compliance	Not Available	Not Sure	
							discussed and customised in the system.
Role Creation and Management	Add/remove available functions to each role in each module	√					The iROADS system has an inbuilt user role management module using which the administrative users can assign/remove features/functions for a particular user role in the system.
	Create new role(s) in each module	√					The iROADS system has an inbuilt user role management module using which the administrative users can create new user roles in the system.
Login to the RIS & RMMS system	Login screen using URL or portal sub-domain	√					The iROADS system will display a login page to the users when the application URL is accessed from any standard browsers.
	On-line Password retrieval /reset using mobile number and OTP	√					The iROADS system allows the users to retrieve/reset their password using

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Function	Sub-Function	Compliant					Details of Compliance
		Fully Functional	Customisable	Partial Compliance	Not Available	Not Sure	
							mobile number and OTP.
Login Homepage	Quick access to modules, dashboard, reporting, Web-GIS etc.		√				The iROADS system allows the users to set up the favourite pages in the menu.
4.2.3.2	*Road Information System*						
Asset info and general	Create Road or other asset by either copying from external vector/shape file or digitizing overlaid-image		√				The iROADS system allow the users to upload the network data and other assets using shape file and CSV file. Digitizing overlaid image is not supported as it requires ArcGIS server and some manual effort to perform this activity. This shall add unnecessary additional costs to the client and the project.
	Assign asset jurisdictions/Classification etc.	√					The iROADS system allows the user to choose a road section/asset and assign asset jurisdictions/classifications etc.
	Rename Road	√					The iROADS system

Function	Sub-Function	Compliant					Details of Compliance
		Fully Functional	Customisable	Partial Compliance	Not Available	Not Sure	
							allows the user to rename an existing road.
	Split/Merge Road Segments	√					The iROADS system allows the user to split/merge the existing road sections and create new sections based on that.
	Recalibrate Road by chainage	√					The iROADS system allows the user to recalibrate the existing road network by chainage.
	Retire Road	√					The iROADS system allows the user to retire a road/road section from the network.
	Search/ View /download roads, geo tagged video data	√					The iROADS system allows the user to search road sections based on attributes, view the selected road on the map and view any photo/video attachments uploaded against the road section.
	View data in Reports and in Web-GIS	√					The iROADS system allows the user to

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Function	Sub-Function	Compliant					Details of Compliance
		Fully Functional	Customisable	Partial Compliance	Not Available	Not Sure	
							produce reports based on the data stored in the system.
Road Inventory	Define road inventory list and data entry Using Form by road	√					The iROADS system allows the user to add a new inventory item using the form in addition to the import modules.
	Data entry Using CSV Loader by roads (option to download formats)	√					The iROADS system allows the user to bulk upload the inventory data using a pre-defined CSV template. The system shall perform necessary validations while uploading the data.
	Data entry using online forms for each stretch of road (all type of data) including uploading specific type of files containing specific data	√					The iROADS system allows the user to add road sections using the form in addition to the import modules.
	Upload/View photographs/documents/ video (geo-tagged) all type of data depending upon jurisdiction	√					The iROADS system allows the users to upload photo, videos against the network and inventory items as attachments. The uploaded photos and

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Function	Sub-Function	Compliant					Details of Compliance
		Fully Functional	Customisable	Partial Compliance	Not Available	Not Sure	
							videos can be displayed in the application along with the road section.
	Edit/Update	√					The system allows the users with adequate privileges to edit and update the data.
	Search, view data and download	√					The iROADS system allows the user to search road sections based on attributes, view the selected road on the map and view any photo/video attachments uploaded against the road section.
	View data Reports and in Web-GIS	√					The system allows the users with adequate privileges to view and produce reports based on the data.
	View in Strip-charts, graphical reports, GIS maps		√				The system supports the display of strip charts, graphical reports and GIS maps etc. The exact report/chart requirements can be captured and the system can be

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Function	Sub-Function	Compliant					Details of Compliance
		Fully Functional	Customisable	Partial Compliance	Not Available	Not Sure	
							customised to include those.
Pavement Composition, Pavement condition, Roughness, RoW, terrain features, environment and disaster related data etc	Define attribute list and data entry Using Form by road	√					The iROADS system allows the user to add pavement condition data using the form in addition to the import modules.
	Data entry Using CSV Loader by roads (option to download formats)	√					The iROADS system allows the user to bulk upload the condition data using a pre-defined CSV template. The system shall perform necessary validations while uploading the data.
	Edit/Update	√					The system allows the users with adequate privileges to edit and update the data.
	Upload/View photographs/documents (geo-tagged) all type of data depending upon jurisdiction	√					The iROADS system allows the user to search road sections based on attributes, view the selected road on the map and view any photo/video attachments uploaded against the road section

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Function	Sub-Function	Compliant					Details of Compliance
		Fully Functional	Customisable	Partial Compliance	Not Available	Not Sure	
	Search, view specific data in reports and download	√					The iROADS system allows the user to search road sections based on attributes, view the selected road on the map and view any photo/video attachments uploaded against the road section.
4.2.3.3	*Traffic Information System*						
Traffic Survey Station	Define attribute list and data entry Using Form by road	√					The iROADS system allows the user to add Traffic Survey Station data using the form in addition to the import modules.
	Edit/Update data	√					The system allows the users with adequate privileges to edit and update the data.
	Retire	√					The iROADS system allows the user to retire a traffic survey station.
	Search/View/Download data	√					The iROADS system allows the user to search traffic survey stations based on attributes, view the

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Function	Sub-Function	Compliant					Details of Compliance
		Fully Functional	Customisable	Partial Compliance	Not Available	Not Sure	
							selected road on the map and view any photo/video attachments.
	Upload/View Photographs/documents/ video	√					The iROADS system allows the user to select any traffic survey station and upload photo/video attachments.
Traffic Volume Count Vehicle Type	Define attribute list and equivalency factors Using Form	√					The iROADS system allows the user to add Traffic Volume Count by Vehicle Type data using the form in addition to the import modules.
	Edit/Update data	√					The system allows the users with adequate privileges to edit and update the data.
Axle Based Vehicle Type	Define attribute list and characteristics Using Form	√					The iROADS system allows the user to add Axle Based Vehicle Type data using the form in addition to the import modules.
	Edit/Update data	√					The system allows the users with adequate privileges to edit and update the data.
SCF	Define attribute list/ Add	√					The iROADS system

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Function	Sub-Function	Compliant					Details of Compliance
		Fully Functional	Customisable	Partial Compliance	Not Available	Not Sure	
(Seasonal Correction Factor)	new set and data entry Using Form						allows the user to add SCF using the form in addition to the import modules.
	Edit/Update	√					The system allows the users with adequate privileges to edit and update the data.
	Apply SCF to traffic volume counts to derive AADT		√				The system allows the users to apply SCF to traffic volume counts to derive AADT.
Growth Factor	Define attribute list/ Add new set and data entry Using Form	√					The iROADS system allows the user to add Growth Factors using the form.
	Edit/Update	√					The system allows the users with adequate privileges to edit and update the data.
	Estimate future traffic by growth factor and by trends	√					The iROADS system allows the user to estimate future traffic by growth factor and by trends
Data Validation	Comparative charts to depict traffic by (direction) hour of the day for each day of volume count	√					The iROADS system has in-built charts to depict traffic by (direction) hour of the day for each day of volume count when the relevant data is

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Function	Sub-Function	Compliant					Details of Compliance
		Fully Functional	Customisable	Partial Compliance	Not Available	Not Sure	
							uploaded into the system
	Comparative charts to depict traffic by daily volume by each week day in previous years		√				The iROADS system has in-built charts to depict the traffic by daily volume by each week day in previous years when the relevant data is uploaded into the system
	Allow data validation by estimating traffic variation		√				The iROADS system has in-built validations while uploading the data. We shall customise the system to include a validation to consider the traffic variation estimation.
Traffic Assignment	Associate traffic station to road	√					The iROADS system allows the user to choose a traffic station and associate it with a road.
	Assign proportional traffic (by vehicle type) to road sections	√					The iROADS system has traffic assignment feature which assigns traffic to road sections based on different rules and parameters.

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Function	Sub-Function	Compliant					Details of Compliance
		Fully Functional	Customisable	Partial Compliance	Not Available	Not Sure	
	Edit defined proportion of traffic	√					The iROADS system allows the users to edit and update the traffic proportion of the selected road section.
	Delete/reassign traffic	√					The iROADS system allows the users to reassign/delete the already assigned traffic proportion of the selected road section.
	View data in reports, Web-GIS	√					The system allows the users with adequate privileges to view and produce reports based on the data.
Traffic Volume Count Data	Data entry Using CSV Loader (option to download formats)	√					The iROADS system allows the user to import the traffic volume count data using a pre-defined CSV template.
	Edit/Update	√					The system allows the users with adequate privileges to edit and update the data.
	Data View/download/Report	√					The iROADS system allows the user to view the traffic stations, traffic count

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Function	Sub-Function	Compliant					Details of Compliance
		Fully Functional	Customisable	Partial Compliance	Not Available	Not Sure	
							data and download the report from the system.
	Delete/Retire	√					The iROADS system allows the user to delete/retire a traffic count station in the system.
	Validate, Commit or Reject data	√					The system shall perform necessary validations while uploading the data and upload/reject the data based on the validation rules.
	Define traffic class	√					The iROADS system allows the user to define the various traffic classes in the system.
	Assign traffic class to sections	√					The iROADS system allows the users to assign traffic classes to road sections.
Axle Load Data	Data entry Using CSV Loader (option to download formats)	√					The iROADS system allows the user to upload data the Axle Load Data using a pre-defined CSV template.
	Edit/Update Axle Load Data	√					The system shall allow the users with adequate privileges to

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Function	Sub-Function	Compliant					Details of Compliance
		Fully Functional	Customisable	Partial Compliance	Not Available	Not Sure	
							edit and update the axle load data.
	View/Download/Report Axle-load	√					The iROADS system allows the user to view the traffic stations, axle load data and download the report from the system.
	Delete Axle Load Data	√					The system shall allow the users with adequate privileges to delete axle load data
	Entry/Edit/Update/View/ Delete Axle-load Volume Count	√					The system shall allow the users with adequate privileges to add, edit, delete axle load volume count data in the system.
	Validate Axle-load with Vol. Count	√					The system can perform necessary validations while uploading the data and upload/reject the data based on the validation rules.
	Commit/reject Axle-load Vol. Count	√					The system shall perform necessary validations while uploading the data and upload/reject the data based on the

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Function	Sub-Function	Compliant					Details of Compliance
		Fully Functional	Customisable	Partial Compliance	Not Available	Not Sure	
							validation rules.
	Edit defined proportion of traffic	√					The iROADS system allows the users to edit and update the traffic proportion of the selected road section.
	Delete/reassign traffic	√					The iROADS system allows the users to reassign/delete the already assigned traffic proportion of the selected road section.
	View data in reports, Web-GIS	√					The system allows the users with adequate privileges to view and produce reports based on the data.
4.2.3.4	*Bridge and Culvert Information System*						
Bridge and culverts Inventory	Define attribute list	√					The system allows the users to define the attribute list for the bridge and culvert inventory items.
	Define bridge/culvert location by chainage in a road	√					The system can define the bridge/culvert location by chainage of the road.
	data entry Using Form	√					The system allows the

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Function	Sub-Function	Compliant					Details of Compliance
		Fully Functional	Customisable	Partial Compliance	Not Available	Not Sure	
							users to create bridge/culvert inventory using the data entry form.
	Data entry Using CSV Loader by roads (option to download formats)	√					The iROADS system allows the user to populate the bridge/culvert inventory in the system using a pre-defined CSV template.
	Edit/Update/Download data	√					The system allows the users with adequate privileges to edit, update, download the bridge inventory data.
	Upload/View images and video for condition and inventory (geo-tagged)	√					The system allows the users to upload photo, video and document attachments against the bridge inventory.
	View data in Report and Web-GIS	√					The system allows the users with adequate privileges to view and produce reports based on the data.
Bridge/culverts Condition	Define defect list by bridge components	√					The system allows the users to define the defect list by bridge components.
	Define defect severity and	√					The system allows the

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Function	Sub-Function	Compliant					Details of Compliance
		Fully Functional	Customisable	Partial Compliance	Not Available	Not Sure	
	extents						users with adequate privilege to define defect severity and extents in the system.
	Define defect priority and condition index parameters	√					The system allows the users with adequate privilege to define priority and condition index parameters in the system.
	Entry inspection data using Form	√					The system allows the users to enter the inspection data using the form.
	Entry inspection data by different time periods	√					The system allows the users to enter the inspection data collected during different time periods
	Estimate bridge condition index for bridges	√					The system has an in-built functionality to estimate the bridge condition index based on the parameters setup by the user in the system.
	Upload/View images and video for condition and inventory (geo-tagged)	√					The system allows the users to upload photo, video and document attachments against the bridge inventory.

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Function	Sub-Function	Compliant					Details of Compliance
		Fully Functional	Customisable	Partial Compliance	Not Available	Not Sure	
	Edit/Update/Download data	√					The system allows the users with adequate privileges to edit, update, download the bridge inventory data.
	View/Download/Report data in Web-GIS	√					The system allows the users with adequate privileges to view and produce reports based on the data.
4.2.3.5	*Web-GIS Interface*						
Selectable Layers (Roads, Bridges, Culverts, Traffic Stations, other assets to be finalized with PWD during design stage)	Click on respective layer to make visible on display panel	√					The system can list all the layers available in the system under layers section. The users can enable/disable a particular layer, control the opacity of layer etc.
	Click to select assets and display summarized information	√					The system can display the information about the selected asset. The information that needs to be displayed for each asset type shall be discussed and finalised during the customisation phase.

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Function	Sub-Function	Compliant					Details of Compliance
		Fully Functional	Customisable	Partial Compliance	Not Available	Not Sure	
	Annotate layers with chainages, names etc.	√					The system can annotate layers with chainages and names.
	Set colour, transparency of the layer	√					The system can allow the user to set the colour and transparency of the layer.
	Select asset to view/download data report, documents, photographs etc.	√					The system allows the users to view the data of the selected asset. The users with adequate privilege can download the data reports and photo, video attachments.
Search and view assets by road	Select jurisdiction and search road	√					The system can allow the users to search and view the assets by jurisdiction and roads.
	Select assets and zoom to the location	√					The system allows the user to choose an asset and zoom to the location of the selected asset.
	Select asset to view/download data report, documents, photographs etc.	√					The system allows the users to view the data of the selected asset. The users with adequate privilege

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Function	Sub-Function	Compliant					Details of Compliance
		Fully Functional	Customisable	Partial Compliance	Not Available	Not Sure	
							can download the data reports and photo, video attachments.
Query on attributes of assets	Select Asset type	√					The system can allow the users to search assets by asset types.
	Select multiple attributes of the asset including jurisdiction	√					The system can allow the users to search assets using multiple attributes including jurisdiction.
	Specify values, conditions matching a criteria	√					The system can allow the users to search assets using multiple attributes including jurisdiction.
	Query to view the matching assets	√					The system can display the assets matching the query criteria entered by the user.
	View/download reports	√					The system allows the users with adequate privileges to view and download reports based on the data.
Additional layers	Integrate additional layers through GIS Server services	√					The system has the capability to integrate with the Client GIS layers and additional layers if the layers are

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Function	Sub-Function	Compliant					Details of Compliance
		Fully Functional	Customisable	Partial Compliance	Not Available	Not Sure	
							supplied in shape file format/web services. The system can import and show the climatic and environmental layers and display them on the GIS interface.
	List layers	√					The system can list all the layers available in the system under layers section. The users can enable/disable a particular layer, control the opacity of layer etc.
	Click on the layer to overlay	√					The system can list all the layers available in the system under layers section. The users can enable/disable a particular layer, control the opacity of layer etc.
	Select to view values/annotations	√					The system can display the information about the selected asset. The information that needs to be displayed

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Function	Sub-Function	Compliant					Details of Compliance
		Fully Functional	Customisable	Partial Compliance	Not Available	Not Sure	
							for each asset type shall be discussed and finalised during the customisation phase.
	Select colour/ transparency etc.	√					The system can allow the user to set the colour and transparency of the layer.
General Features and tools	Zoom and pan	√					The system can provide basic map tools like zoom in, zoom out, pan etc.
	Measuring length and area	√					The system can provide measuring options for measuring the length between two points and measuring area of the selected geometry,
	Adding base layers Overlay like google maps and , other available online map services without any additional charges to PWD	√					The system has the capability to integrate with the Client GIS layers and additional layers if the layers are supplied in shape file format/web services.
	Create points by specifying x and y coordinates	√					The system can create a point based on the x and y coordinates provided by the user.
	Click on road alignment to	√					The system can show

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Function	Sub-Function	Compliant					Details of Compliance
		Fully Functional	Customisable	Partial Compliance	Not Available	Not Sure	
	get x and y coordinates, chainage						the x and y coordinates and chainage of the selected road section/alignment.
4.2.3.6	*General Mobile Application*						
Login and Homepage	Compact login/logout screen		√				The mobile application shall have a compact login/logout screen.
Grievance Redressal	Login using mobile number and password and one time verification using OTP		√				The mobile application shall support the login using mobile number, password and a OTP.
	Mark locations based on GPS based auto fly		√				The mobile application can use the GPS coordinates to mark the location.
	Summarised information about assets such as road and bridge statistics		√				The mobile application can display the summary information about the selected assets. The level of information that needs to be displayed in the mobile application can be discussed and finalised during the

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Function	Sub-Function	Compliant					Details of Compliance
		Fully Functional	Customisable	Partial Compliance	Not Available	Not Sure	
							customisation phase.
Grievance Redressal	Search a road to obtain selected information (inventory, traffic, condition etc.)		√				The system shall allow the user to search a road based on the road attributes and shall display the information requested by the user (inventory, traffic, condition data etc)
	User will have provision to raise Grievance request/ upload photograph / comment		√				The system shall allow the user to raise a grievance request by choosing an asset, and allow them to upload photographs and provide comments.
	Functionality to track Grievances with its current status		√				The system shall provide an option for the user to track the status of the grievance requests raised by them.
	Allot Grievance to division		√				The system shall automatically allot the grievance to division by using the relationship between the asset and division.

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4.3 Preliminary Project Plan

The following section details about the delivery approach and methodology adopted for this project along with the plans for delivering the different tasks highlighted in the RFP document. This section contains the summary of the project plan and details of each activity along with corresponding deliverables are mentioned in Section 4.4 - Activities, Sub-activities and Deliverables.

4.3.1 Project Organization and Management Plan

Based on the RFP, we have created a high level summary of the project management plan for this project. The different activities, sub-activities and deliverables identified for this project is given in detail in 'Section 4.4 - Activities, Sub-activities and Deliverables' of this document. During the inception phase of the project, a detailed project organisation and management plan shall be prepared and delivered to the client.

The project progress can be reported on a weekly basis using a mutually agreed project progress reporting template. The project progress reporting template shall contain a risk register section where all the risks associated with the different project activities shall be recorded with the mitigation plan. This shall allow the risks to be identified at the early stages of the project execution and proper mitigation strategies can be applied to avoid any failures or unforeseen delays during the project execution.

4.3.2 Delivery and Installation Plan

The customisation of the RIS & RMMS system and mobile applications shall be executed at the Consultant's development centres. The installation of the application at SDC shall be done by the Consultant's technical team as it involves some pre-configurations/installations in both the application and database servers. After successful deployments, the further updates can be done by the Consultant's support team after notifying the client team in advance. Please refer 'Section 4.4.2.1 - Sub-activities of Activity 2 –Software Customisation and Hosting of the application in the SDC Staging arrangement' of this document for further details.

4.3.3 Training Plan

Based on the training needs of KSTP for successful establishment and institutionalising of the RIS & RMMS, TRL will propose the Training Plan for the proposed trainings to be conducted under this project. The Training Plan will provide KSTP with the overview of the planned trainings, enabling them to delegate the appropriate attendees for each of the training courses planned.

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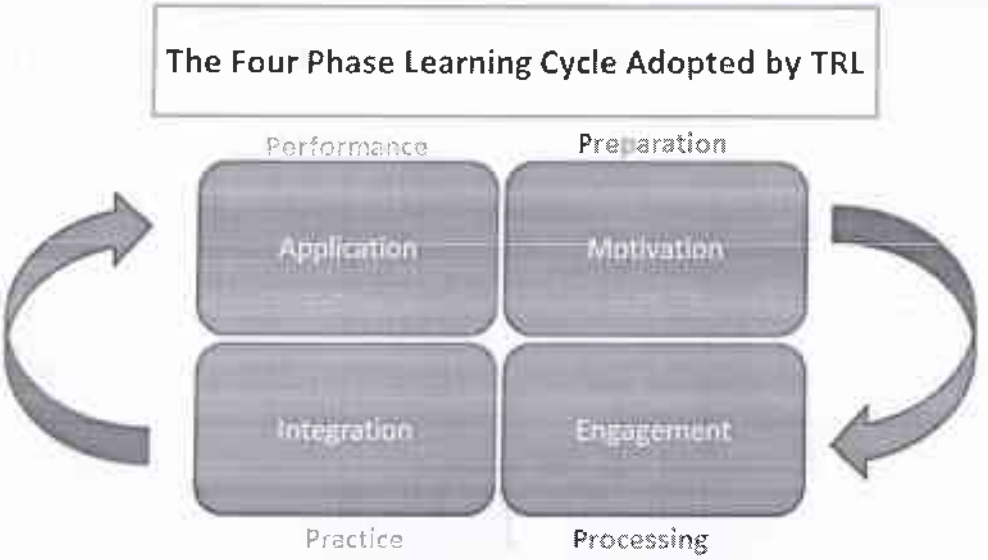


Figure 4-56 : TRL Learning Cycle

The details about the different activities, sub-activities involved in delivering the training can be found in 'Section 4.4.3.1 - Sub-activities of Activity 3 - Training and User Guides of this document.

4.3.4 Pre-commissioning and Operational Acceptance Testing Plan

The operational acceptance testing shall be carried out the Client's premises by the Client test manager/representatives. The Consultant team shall prepare and share the acceptance test cases along with the acceptance test plan during the early stages of the project execution. The Consultant team members shall use the approved test cases as base for their operation testing. The Consultant's team shall assist the client test manager/testing team in executing the test cases. The defects identified during the operational accepting testing plan shall be fixed by the Consultant's development team. Please refer 'Section 4.4.2.1.0.9 - User Acceptance Testing by the Client and Bug Fixes' for more details about the pre-commission and operational acceptance testing plan.

4.3.5 Warranty Service Plan

The Consultant shall provide support and maintenance services for 5 years as requested in the RFP document. Please refer 'Section 4.4.5 - Activity 5 - Software Support and Maintenance for 5 years' of this document for more details about the scope of the warranty service plan.

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4.3.6 *Task, Time, and Resource Schedules*

The project shall be executed based activity, sub-activity model. Please refer 'Section 4.4.8 Work Schedule and Planning for Deliverables' of this document to know more details about the different tasks identified, time required for delivering various tasks and the resource schedules etc.

4.3.7 *Post-Warranty Service Plan*

The Consultant shall provide support and maintenance services for subsequent 3 years after the first 5 year period as requested in the RFP document. Please refer 'Section 4.4.6 - Software Support and Maintenance for subsequent 3 years' of this document for more details about the scope of the post-warranty service plan.

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4.3.8 *Technical Support Plan*

The Consultant shall provide technical support and maintenance services for 5 years as requested in the RFQ document. Please refer 'Section 4.4.5 - Software Support and Maintenance for 5 years' and 'Section 4.4.6 - Software Support and Maintenance for subsequent 3 years' of this document for more details about the scope of the warranty service plan.

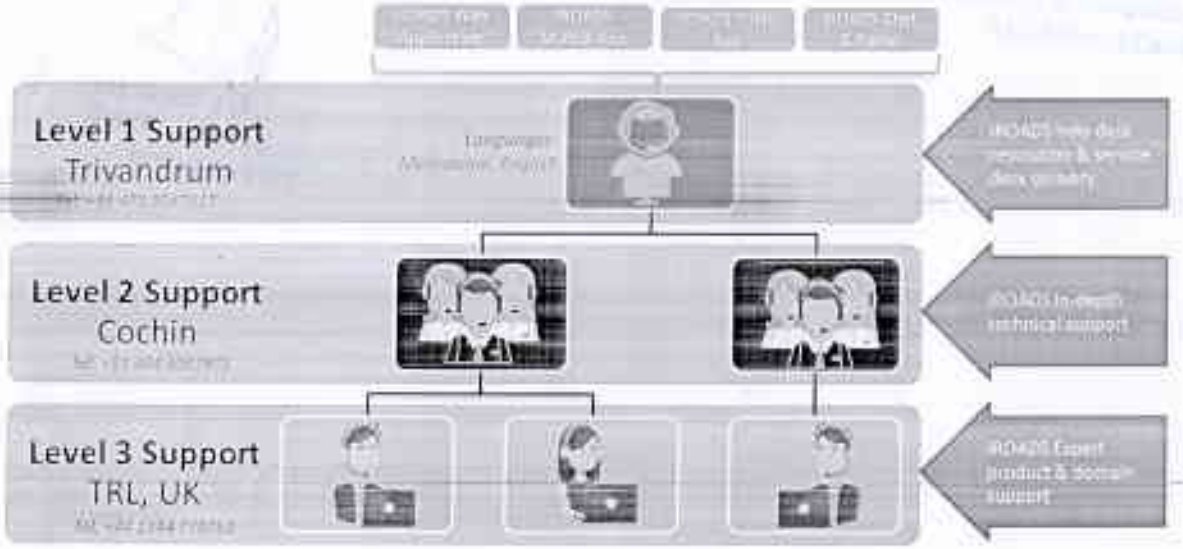


Figure 4-57: Level 1 & Level 2 Support will be based out of Trivandrum and Cochin for 8 years

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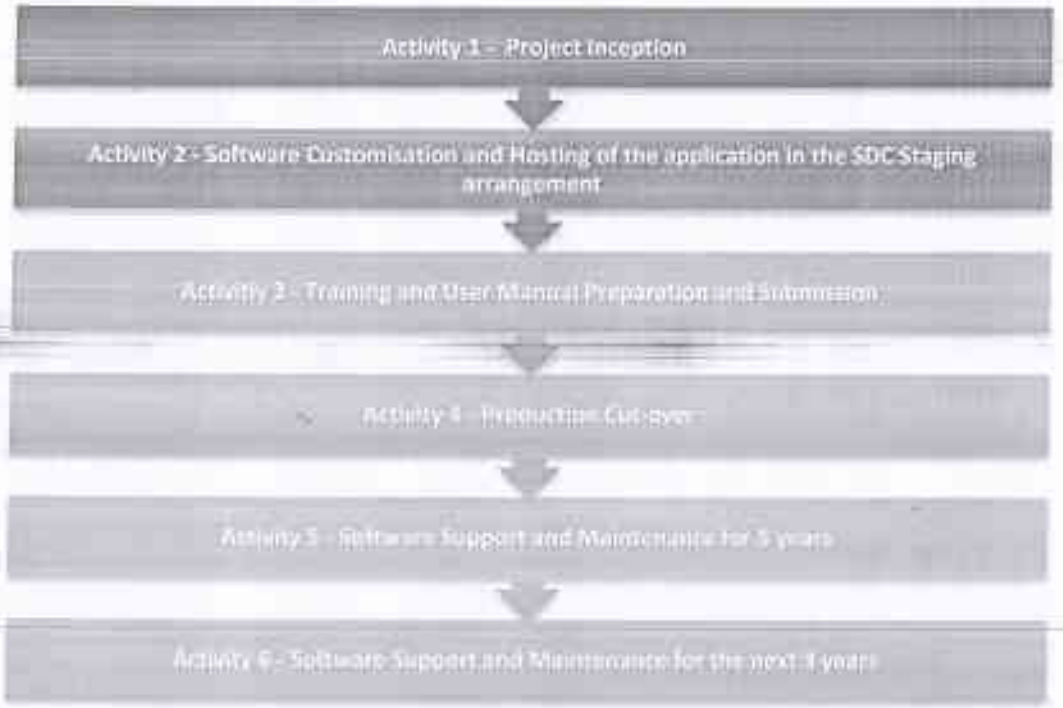
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4.4 Activities, Sub-activities and Deliverables

This section details the Activities, Sub-activities and Deliverables proposed for this project. This section presents the methodology and detailed work plan proposed for carrying out the services to the Client.

The activity based methodology and work plan can be read in conjunction with the work schedule given in 'Section 4.4.8 - Work Schedule and Planning for Deliverables'. This Section describes in detail the Consultant's methodology, work plan and associated components of our general approach to performing the services.



4.4.1 Activity 1 – Project Inception

In line with the Consultant's intended approach to the services, the Consultant will start focusing on familiarisation with the project background. It is the intention of the Consultant to spend the time and resources necessary to ensure that all team members are very well acquainted with the constraints and requirements of KSTP before they start undertaking the specific tasks and activities.

The first key activity of this project is project inception. During the project inception phase, the Project Team will meet to review the specific tasks related to the project and its overall

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objectives, the team responsibilities and to make mobilisation arrangements. The project inception activity shall have the following sub-activities.

- Project Team Mobilisation
- Convene Inception Meeting

> Identify the key stakeholders in the business and technical teams, including those of interfacing systems

> Discuss proposed schedule Including deliverables

> Discuss the interfacing requirements for interfacing with PRICE and WINGS systems from PWD

- Asses the existing IT Infrastructure available at the SDC
- Prepare and Submit Inception Report with System Architecture / Design Report (all the modules and components) and acceptance testing plan

4.4.1.1 Sub-activities of Activity 1 – Project Inception:

The following are the sub-activities identified for this activity.

4.4.1.1 0.1 Project Team Mobilisation:

The Team Leader will be responsible for mobilisation of other team members and for establishing communication and reporting protocols. All team members including key professional staff and other staff will be mobilised at the beginning of the project.

4.4.1.1.0.2 Convene Inception Meeting:

The following are the pre-requisites for this sub-activity.

- Identify the key stakeholders from business and technical teams
- Finalise the date for Inception meeting

Within a week of project initiation, the Client shall organise an inception meeting at the KSTP office in Kerala, and will provide a briefing on the work plan based on the proposal. The objective of this meeting shall be to outline:

- TRL's team structure and expertise,
- Lines of responsibility and communication to the KSTP
- The roles of stakeholders and the approach to stakeholder consultation,
- Detailed explanation of the approach to the project,
- Proposed schedules including deliverables,

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- Interface requirements and discussions with PRICE and WINGS teams
- Report format requirements

During the period of mobilisation and familiarisation with the project, the Team Leader will provide a detailed description of tasks, initiate the work implementation schedule, prepare the initial weekly programmes and hold the first weekly internal coordination meeting. Team Leader will begin to coordinate collection of data and associated information, documents, reports and other materials necessary for the project execution. They will set up the documentation centre and computer sharing system to ensure that all team members (i) have access to the data and information they need; and (ii) can share data and reports with the Team Leader and other team members.

TRL recommends that this project would benefit significantly from having a dedicated project manager from KSTP who will work with TRL on a day to day basis for approvals, signoffs and coordination, since this project has an intensive schedule. The Client project manager need not specifically be an IT staff member but they should have an overall understanding of the project and also sufficient authority for signing off approvals. TRL's recommendation to have a dedicated project manager from the Client side shall be discussed during the inception meeting.

This project has a tight timeline, and so it will be extremely important that KSTP provides the approvals for deliverables punctually. Since the project activities are sequential, it will be essential to achieve approvals promptly so progress is not held-up. If review comments on deliverables are not made available by KSTP within 2 working weeks after submission, the immediate following activities shall be put on hold. TRL shall emphasise the importance of ensuring review and feedback of deliverables within 2 working weeks of submission, to ensure compliance with the schedule.

4.4.1.1.0.3 IT Assessment Activities

Consultant's Technical Team, will meet with SDC infrastructure team to understand and assess the current IT infrastructure available at SDC. It is stated in the RFP that the RIS & RMMS System would be hosted on the existing cloud hosting infrastructure of the State data centre of Kerala. The specifications for server infrastructures required in SDC infrastructure are specified in 'Section 4.1.3.5 - Hardware/Software Requirements' , so that SDC and Client can arrange the required infrastructure in advance.

An important procedure to support implementation of RIS & RMMS in SDC is the review of the Client's IT infrastructure and processes. This assessment will identify the suitability of the current infrastructure to host the proposed solution. The Consultant's Infrastructure team together with skilled technical support staff will visit the SDC to discuss the detailed technical requirements with relevant staff from the Client side. The Consultant shall conduct

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a detailed review of the existing IT infrastructure at Client Location with a focus to prepare for the preliminary deployment of the TRL iROADS OTB solution. This task will also provide an opportunity to share information with the Client IT staff and to overcome any misconceptions as to the scope and deployment the iROADS solution.

Typical subject areas which will be addressed will include:

> Hardware Platforms available

> System software available

> Database software

> Understand the hardware, software and network used currently

> Identifying gaps (if any) in the existing infrastructure of the Client, to install TRL's Off the Shelf solution

> Communication and Discussions with the Client IT team to resolve the infrastructure gaps to enable installation of the system

> Provision of relevant interfacing mechanisms and the support from the SDC

4.4.1.1.0.4 Initiation of IT Related Procurement

The Client team shall initiate the IT related procurement during this phase to fill any gaps identified in the existing infrastructure of the client, so that the procurement process is completed by the time the RIS & RMMS application is ready for UAT.

4.4.1.1.0.5 Prepare and Submit Inception Report:

The following are the pre-requisites for this sub-activity.

- Completion of the Inception Meeting

The Consultant shall prepare and submit the inception report with in 3 weeks from the project commencement date. The inception report shall include,

- Project Objectives and Scope of the project
- Project Management Plan. The project management plan shall contain,
    - Project Organization and Management Plan;
    - Delivery and Installation Plan
    - Training Plan
    - Pre-commissioning and Operational Acceptance Testing Plan
    - Warranty Service Plan

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- Task, Time, and Resource Schedules
- Post-Warranty Service Plan
- Technical Support Plan

- Consultant's team structure
- System Architecture/ Design Report (all the modules and components)
- Acceptance testing plan
- Agreed schedules including deliverables
- Summary of the Infrastructure Assessment
- Risk Register

4.4.1.2 *Deliverables for Activity 1 – Project Inception:*

Deliverable(s)
The following are the list of deliverable(s) identified for this activity. ▪ Inception Report with System Architecture/ Design Report (all the modules and components) and acceptance testing plan

4.4.1.3 *Client Dependencies & Responsibilities for Activity 1 – Project Inception:*

Client Dependencies & Responsibilities
The following are the list of client dependencies and responsibilities identified for this activity. ▪ Identify the key stakeholders from business and technical teams ▪ Finalise the date for the inception meeting and invite all relevant stakeholders for the meeting. ▪ Arrange access to the State Data Centre for Infrastructure Assessment ▪ Share any associated information, documents, reports and other materials necessary for the project execution with the project team ▪ Provide timely feedbacks and signoff's to ensure smoother project execution ▪ Arrange meetings with the interfacing systems team (PRICE and WINGS Software)

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4.4.2 *Activity 2 - Software Customisation and Hosting of the application in the SDC Staging arrangement*

This activity covers the following tasks specified in the Section C. Scope of Services, Page 150 of the RFP document. By successfully executing this activity and the key sub-activities identified for this activity the Consultant shall complete the objectives of the below tasks from the RFP.

- **Task-1** - Supply, configure, host and maintain a commercial well established and time tested, web and GIS-based, state of the art, off the shelf RIS & RMMS system
- **Task-2** Supply, configure, host and maintain a Mobile application for both the Android and iOS system which works on the above mentioned RIS & RMMS system framework and database for Kerala PWD (with all necessary supporting software installations), that would be used by the general public to get information on the PWD road assets and to submit feedbacks/grievances/complaints using web GIS facilities



- **Task-3** Review the data collection procedures based on requirements of RMMS system, HDM-4 analysis and other MIS reporting and analysis requirements of the Department and to Supply, configure, host and maintain custom made web based Smartphone apps (both in Android and iOS) to collect field data together with its storage and integration with the central RMMS server.

In this activity, the Consultant shall analyse the requirements of the RIS & RMMS system, public facing mobile application, data collection application for the PWD Engineers and customise the client's proposed system to meet the requirements. The key sub-activities are:

- Arrange requirement sessions/meetings with PM/Functional expert team at KSTP to discuss and gather the requirements for the various components of the RIS & RMMS System.
- Arrange requirement sessions/meetings with PM/Functional expert team at KSTP to discuss and gather the requirements for public facing mobile application and field data collection mobile application for the PWD Engineers.
- Analyse existing data forms, data, results of forecasting models, actions taken based on the forecasts etc to understand the requirements in detail.
- Discussion with interfacing system owners (PRICE, WINGS) to detail the implementation of interfaces between iROADS and these systems.

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- Prepare and submit the system requirement specification report with Interface Control Documents (ICD) for interfacing with PRICE and WINGS system.
- Arrange Requirement meeting/session to walkthrough the requirements identified for the RIS & RMMS system and mobile applications.
- Customise the iROADS application to match with KSTP Requirements.
- Customise the mobile application for general public use.
- Customise the mobile application for PWD Department users.
- Internal testing of the web application, mobile applications.
- Verify the Staging Infrastructure readiness at the SDC.
- Hosting of the web application and mobile application in SDC Staging Environment.
- User Acceptance testing by the client.
- Fix any bugs identified during the UAT process.

4.4.2.1 Sub-activities of Activity 2 –Software Customisation and Hosting of the application in the SDC Staging arrangement

The following are the various sub-activities identified for this activity.

4.4.2.1.0.1 Requirement analysis and Preparation of the System Requirement Specifications Report:

The following are the pre-requisites for this sub-activity.

- Arrange meetings with PRICE and WINGS teams to discuss the interfacing strategy
- Share any relevant documents with the project team

The Consultant team shall analyse and understand the AS-IS business process followed at the client side by conducting meetings/discussions with the client stakeholders. The Consultant team shall compare the AS-IS process with the To-Be process and identify the product gaps as well as the customisation configuration requirements.

The consultant team shall conduct discussions with the PRICE and WINGS software management teams on the interfacing requirements and the methodology for interfacing the systems. The Consultant team shall also review the data collection procedures based on requirements of RMMS system, HDM-4 analysis for the PWD Data Collection application.

The Consultant team shall prepare and share the system requirement specifications report based on the customisation configuration requirements identified.

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4.4.2.1.0.2 Customisation of the iROADS application to match with the RIS & RMMS requirements:

The following are the pre-requisites for this sub-activity.

- Approval/Signoff of the system requirement specification report.

The Consultant team shall customise the iROADS application based on the approved requirements from the system requirements specification report.

4.4.2.1.0.3 Customise the mobile application for general public use:

The following are the pre-requisites for this sub-activity.

- Approval for the system requirement specification report is required from the client side.

The Consultant team shall customise the mobile application for general public use based on the approved requirements from the system requirements specification report.

4.4.2.1.0.4 Customise the mobile application for PWD Department:

The following are the pre-requisites for this sub-activity.

- Approval for the system requirement specification report is required from the client side.

The Consultant team shall customise the mobile application that will be used for the field data collection by the PWD Engineers use based on approved requirements from the system requirements specification report.

4.4.2.1.0.5 Verify the hardware readiness and submit the infrastructure readiness verification report:

The following are the pre-requisites for this sub-activity.

- Ensure the staging environment at the SDC is ready as per the recommendations outlined in the Infrastructure Assessment Summary section in the Inception Report.
- Arrange access to the State Data Centre for Infrastructure readiness verification.

It is expected that the staging environment for hosting the application at State Data Centre (SDC) will be readied by the client by the end of 3rd month so that the customised RIS & RMMS system can be hosted in the SDC. The detailed hardware and software requirements for hosting the application at SDC is provided in 'Section 4.1.3.5 - Hardware/Software Requirements' of this document. As clarified in the pre-bid questionnaire, question number 37, the SDC Infrastructure will be used for hosting the application and the additional costs for any further hardware procurement will be taken care by the Client. The Consultant team

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shall verify the infrastructure availability and readiness prior to the hosting at the SDC and shall share the indicative costs required for the procurement of additional hardware to complete the hosting and to provide acceptable user experience.

The Consultant team shall verify the infrastructure availability and readiness prior to the hosting at the SDC. Any delay in arranging/setting up the staging environment in SDC shall lead to delays in the project schedule.

4.4.2.1.0.6 Internal testing of the RIS & RMMS system and mobile applications:

The following are the pre-requisites for this sub-activity.

- The customised web and mobile applications are hosted locally and available for testing

The Consultant team shall test the RIS & RMMS systems and mobile applications internally before releasing to the client. The verification of the application will be performed to ascertain its readiness prior to usage by the Client.

4.4.2.1.0.7 Apply for the Security Audit of the web application and mobile applications:

The following are the pre-requisites for this sub-activity.

- The customised web and mobile applications are hosted and the details are shared with the certification agency for security audit

The Consultant team will apply for the security audit of the entire the system through certified CERT auditors acceptable to the SDC-Kerala authorities for hosting of the application in the State data centre. This activity shall include the following sub-activities,

- Apply for the Security Audit of the application
- Fix any issues identified during the Security Audit
- Reapply for the security audit if necessary
- Obtain Security Audit approval certificate

4.4.2.1.0.8 Hosting of the web application and mobile application in SDC Staging Environment:

The following are the pre-requisites for this sub-activity.

- The staging environment should be ready and available for hosting

The Consultant team shall release the RIS & RMMS system in the staging environment at the SDC and share the details with the client. The mobile application installable files shall be shared separately for the verification by the client.

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4.4.2.1.0.9 User Acceptance Testing by the Client and Bug Fixes:

The Client team can verify the system based on the requirements specified using the approved acceptance test cases shared by the Consultant team. Any defects identified during the testing process shall be fixed by the Consultant IT team.

4.4.2.2 Deliverables for Activity 2 – Software Customisation and Hosting of the application in the SDC Staging arrangement:

Deliverables
The following are the list of deliverables identified for this activity. ▪ SRS including Interface Control Document ▪ ATC Suite ▪ Release Notes for UAT Release

4.4.2.3 Client Dependencies & Responsibilities for Activity 2 – Software Customisation and Hosting of the application in the SDC Staging arrangement:

Client Dependencies & Responsibilities
The following are the list of client dependencies and responsibilities identified for this activity. ▪ Dedicated presence of a decision making Project Manager/Functional expert at KSTP end is required to firm up the requirements in the 4 weeks following the inception phase. ▪ Arrange meetings with the interfacing systems team (PRICE and WINGS Software) to discuss and finalise the interfacing strategy ▪ Share any existing data forms, data, results of forecasting models, actions taken based on the forecasts etc with the project team during the requirements phase. ▪ Finalise the date for the requirement walkthrough/session after consulting with the stakeholders ▪ The client should procure the App Store and Play Store accounts in their name (or) share the details if the account is already available, so that the app can be published using the Client's name in App Store and Play Store. ▪ Arrange access to the State Data Centre for Infrastructure readiness verification and for hosting the application ▪ Ensure the staging environment at the SDC is ready as per the recommendations outlined in the Infrastructure Assessment Summary section in the Inception

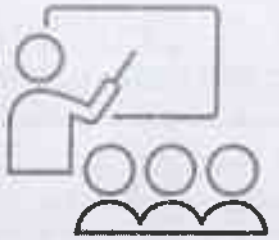
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- Procure and share the SSL Certificate
- Provide timely feedbacks and signoff's to ensure smoother project execution

4.4.3 *Activity 3 - Training and User Manual Preparation and Submission*

This activity covers the following tasks specified in the Section C. Scope of Services, Page 150 of the 'RFP. By successfully executing this activity and the key sub-activities identified for this activity, the Consultant shall complete the objectives of the below tasks.



- **Task-6** Provide all technical assistance for integrating and harmonising the RMMS system and HDM-4 software (Department shall procure the HDM-4 software separately) and render necessary help (RMMS software related) in determining the annual maintenance needs for road asset management and help to prepare annual work programs (AWP) and multiyear rolling work programs based on plan and non-plan budgets for network improvement and Annual Maintenance Plans (AMP) containing the identified needs based on the budget allocation
- **Task-7** Provide necessary training to the designated departmental staff in the software systems established both in terms of its functioning, usage and administration and to establish a sustainable arrangement for continuance of training for an agreed time as per an agreed schedule

The following are the list of sub-activities identified for this activity.

- Provide technical assistance for integrating and harmonising the RMMS system and HDM-4 software
- Preparation and submission of training plan
- Preparation and submission of training materials
- Update the training plan and training materials based on the feedback
- Delivery of Trainings
- Preparation and submission of the Programmers User Manual
- Preparation and submission of the Configuration and Customisation user manual
- Preparation and submission of the Configuration and Customisation Administrator manual

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- Preparation and submission of the Procedure Manual to integrate external application

4.4.3.1 *Sub-activities of Activity 3 - Training and User Guides*

The following are the various sub-activities identified for this activity.

4.4.3.1.0.1 Preparation and submission of training plan:

The Consultant team shall prepare a detailed training plan and share it with the KSTP team for their feedback and approval. The training plan shall include the class room lectures and hands-on training. Any changes suggested to the proposed training plan by KSTP team shall be updated in the training plan and a revised training plan shall be shared with the client. The sub-activities are,

- Prepare and share the training plan for KSTP review
- Update training plan based on the feedback received from KSTP
- Finalise the training plan

4.4.3.1.0.2 Preparation and submission training materials:

The Consultant team shall prepare the training materials and share it with the KSTP team for their feedback and approval. The comments/feedbacks received from the KSTP on the training materials shall be be updated and the updated training material shall be shared with the client. The sub-activities are,

- Prepare and share the training materials with KSTP for their review
- Update the training materials based on the feedback received from KSTP
- Finalise the training materials

4.4.3.1.0.3 Delivery of training:

The Consultant shall deliver the training as per the agreed training plan using the approved training materials. The training program shall cover,

- Train a minimum of 100 PWD Engineers on system use, data input, analysis and interpretation
- Train the trainers program for fourteen (14) PWD engineers as trainers to continue training programmes and provide training material for all the engineers
- Train 5 engineers in configuration and customization of the RIS & RMMS software including field data collections app

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The key activities are,

- Delivery of the training
- Prepare and submit the training completion report

4.4.3.1 0.4 Preparation of the user guides and manuals:

The Consultant team shall prepare and share the various user guides and manuals required for the system. The user guides and manuals shall include,

- Programmers & User Manual with details about Database, Programming File Details & Various Compiled component of the software system
- Configuration & Customization User Manual
- Configuration &Customization Administrator Manual
- Procedure Manual to integrate external application

The key activities are,

- Preparation and deliver of the user guides

4.4.3.2 Deliverables for Activity 3 - Training and User Guides

Deliverables
The following are the list of deliverables identified for this activity. ▪ Training Plan ▪ Training Materials ▪ Training Completion Report ▪ Programmers & User Manual with details about Database, Programming File Details & Various Compiled component of the software system ▪ Configuration & Customization User Manual ▪ Configuration &Customization Administrator Manual ▪ Procedure Manual to integrate external application

4.4.3.3 Client Dependencies & Responsibilities for Activity 3 - Training and User Guides

Client Dependencies & Responsibilities
The following are the list of client dependencies and responsibilities identified for this

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activity.

- Identify the candidates for the training program
- Provide timely feedbacks and signoff's to ensure smoother project execution

4.4.4 Activity 4 - Production Cut Over

This activity covers the following tasks specified in the Section C. Scope of Services, Page 150 of the RFP document. By successfully executing this activity and the key sub-activities identified for this activity, the Consultant shall complete the objectives of the below tasks from the RFP document.

- Task 4 Provide licenses and associated costs for AMC during the first 5-year period for all the proposed technologies and third party software used for application/database/GIS map/Web servers and all associated middleware together with all cost for the complete maintenance and upkeep of the whole system established under this contract.
- Task-5 Provide all necessary technical support for the installation and hosting of the RIS & RMMS software system and mobile app support systems in the designated Data Centre installation (State owned having internal cloud infrastructure) or at a central facility as directed by the Department including installation of all necessary supporting software systems for cyber-security compliances and database management.

The following are the list of sub-activities identified for this activity.

- Ready the production environment at the SDC
- Verify the Production Infrastructure readiness at the SDC
- Hosting of the web application and mobile application in SDC Production Environment
- Share license for the RIS & RMMS system and mobile applications with KSTP

4.4.4.1 Sub-activities of Activity 4 – Production Cut-over

The following are the various sub-activities identified for this activity.

4.4.4.1.0.1 Verify the hardware readiness for the production hosting:

The Pre-requisites are,

- Ensure the production environment at the SDC is ready as per the recommendations outlined in the Infrastructure Requirements specified in the Inception Report.

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- Arrange access to the State Data Centre for Infrastructure readiness verification.

It is expected that the production environment for hosting the application at State Data Centre (SDC) will be readied by the client by the end of 4th month so that the customised RIS & RMMS system can be hosted in the SDC

The detailed hardware and software requirements for hosting the application at SDC is provided in 'Section 4.1.3.5 - Hardware/Software Requirements' of this document. As clarified in the pre-bid questionnaire, question number 37, the SDC Infrastructure will be used for hosting the application and the additional costs for any further hardware procurement will be taken care by the Client. The Consultant team shall verify the infrastructure availability and readiness prior to the hosting at the SDC and shall share the indicative costs required for the procurement of additional hardware to complete the hosting and to provide acceptable user experience. If this is delayed, the hosting of the application production instance will be delayed and hence the rollout of the system shall also be significantly delayed.

4.4.4.1.0.2 Verify the Play Store and App Store accounts for hosting the mobile application:

The client shall create/register the accounts for hosting the Android and iOS applications in Play Store and App Store respectively and shall share the access details with the Consultant.

The Consultant team shall verify the status of the account and any other settings/configurations that needs to be enabled to publish the mobile applications in the Play Store and App Store.

4.4.4.1.0.3 Hosting of the web application and mobile application in SDC Production Environment:

In order to proceed with this activity, it is critical that the hosting environment is ready and available at the SDC. In addition to the hosting arrangements at SDC, the access details of the accounts for hosting the Android and iOS applications in Play Store and App Store should be created and shared with the Consultant. Any delay in the above tasks shall lead to further delays in the subsequent tasks which are dependent on the above.

The Consultant team shall release the RIS & RMMS system in the production environment at the SDC and share the details with the client.

The iOS and Android mobile applications shall be published to the App Store and Google Play Store respectively using the client's account so that the applications can be published under the client's name in Play Store and App Store.

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4.4.4.1 0.4 Share license for the RIS & RMMS system, mobile applications with KSTP:

The Consultant team shall share the license for the RIS & RMMS system and the mobile applications with KSTP.

4.4.4.2 Deliverables for Activity 4 – Production Cut-over

Deliverables
The following are the list of deliverables identified for this activity. ▪ Application Release Notes (Production) - Web and Mobile Application ▪ Software Licenses

4.4.4.3 Client Dependencies and Responsibilities for Activity 4 – Production Cut-over

Client Dependencies & Responsibilities
The following are the list of client dependencies and responsibilities identified for this activity. ▪ Ensure the production environment at the SDC is ready as per the recommendations outlined in the Infrastructure Assessment Summary section in the Inception Report. ▪ Arrange access to the State Data Centre for Infrastructure readiness verification and for hosting the application ▪ Provide timely feedbacks and signoff's to ensure smoother project execution

4.4.5 Activity 5 - Software Support and Maintenance for 5 years

This activity covers the following tasks specified in the Section C. Scope of Services, Page 150 of the RFP document. By successfully executing this activity and the key sub-activities identified for this activity, the Consultant shall complete the objectives of the below tasks.

- Task-8 System maintenance and support

The Consultant shall provide the software support and maintenance services for 5 years as quoted in the RFP document. This software support and maintenance agreement will cover any modifications required to the application source code in response to any faults or problems identified by users of the application.

4.4.5.1 Scope of Software Support:

Following are the major activities coming under the scope of 'Software Support and maintenance' of the proposed system.

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Application Support Services: TRL shall provide support to resolve problems in using the application. Support activities will be conducted at TRL office premises . This shall involve the following:

- Fixing any defects in the Software as per the service levels
- Resolving problems in the production environment. This will include:
  - Rectifying data inconsistencies in production database arising due to software problems
  - Resolving problems due to incorrect application settings/configuration related to application deployment
- Suggesting work-around for defects
- Promoting software patches / releases, after giving due notice to client.
- Providing reports to client, including Quarterly Reports.
- Provision to keep the support requests organized and efficient through a shared spreadsheet.

Items not included in Application Support Services:

- Trainings other than the ones mentioned in Section 4.4.3.1.0.3 - Delivery of Training
- Problems occurring due to unavailability of client external services – like unavailability of GIS services from OpenStreetMap etc
- Any issues arising due to infrastructure, hosting, communication, SDC maintenance, SDC's internal network issues etc. at the SDC shall not be supported by the Consultant since these activities are completely managed by SDC team.
- Customisation / Enhancement of features, unless explicitly contracted for.

Working Hours: Working hours of TRL Support Team will be from 9 AM IST to 5 PM IST from Monday to Friday. Saturday and Sunday will not be considered as working days, along with the annual holidays for regional TRL offices.

Support Process Summary :

- Client will send an email to the TRL Support Team (support e-mail ID shall be provided) (or) send a message on the TRL's online support chat tool (Skype/Slack) (or) call the TRL support team through a dedicated mobile number. It is recommended that client sends the problem e-mail with the following information: Name of the person, Organization/Department within client, Email Address, Phone Number, Problem Description, Module Affected, Problem Severity, Number of users or % of users affected etc.

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- TRL Support Team will acknowledge the receipt of the e-mail/online chat/voice chat and provide a ticket number to uniquely identify the request.
- TRL Support Team will diagnose the problem reported and find a workaround for the problem, if possible (especially if the resolution requires a longer time).
- TRL Support Team will interact with client team, if additional information is required.
- TRL Support Team will resolve the defect according to the Service Level Definitions and Deliver / Release the fixes.
- Once resolved, the support team will inform client of the workaround or solution and update of the incident's closure after getting confirmation from client.
- TRL Support Team will maintain Service Level Reports.
- TRL Support Team will deploy the patches / releases in the server after giving due notice to client.

Support Process Details:

Details of the support process workflow are as indicated below:

Process Step	Role	Activity	Ticket Status
Receive the e-mail from client/Receive the online chat from client/Receive the call from the client	TRL Support	Collect problem details: Name, organization, instance name, problem details and problem severity etc.	New
Log problem details and send Ticket Number	TRL Support	Generate a Support Ticket Number. Fill in all required fields for processing a Support Ticket Number, into a support tracking spreadsheet template. Inform client of the Ticket Number for future reference.	Assigned
Analyse and Resolve	TRL Support	Analyse problem. If the problem will take longer duration to resolve, the consultant will inform client of any possible workarounds. The Support Engineer works on the problem and resolves the problem within the service levels.	Fixed

TRL Support Team will send the following status reports:

Status Report	Frequency
Quarterly Support & Maintenance Summary Report	Quarterly

4.4.5.2 Deliverables for Activity 5 – Software Support and Maintenance for 5 years

Deliverables
The following are the list of deliverables identified for this activity. ▪ Quarterly Support and Maintenance Summary Report

4.4.6 Activity 6 - Software Support and Maintenance for subsequent 3 years after the first 5 years

The Consultant shall provide the software support and maintenance services for additional 3 years after the completion of the software support for the first 5 years period as mentioned in the RFP document.

The scope of the software support and maintenance for this 3 year period shall be the same as that of the scope specified for the first 5 year period. Please refer 'Section 4.4.5.1 – Scope of Software Support' to know more details about the scope of software support and maintenance.

4.4.6.1 Deliverables for Activity 5 – Software Support and Maintenance for 3 years

Deliverables
The following are the list of deliverables identified for this activity. ▪ Quarterly Support and Maintenance Summary Report

4.4.7 Change management (CR) / new features

A specific process for change management will be defined to manage changes during the various phases of the project. Any changes to be developed in the delivered product, irrespective of whether they are minor or major, shall be driven through the change management process. All changes to the deployed application will be managed as change requests and will be put through the change management process. Defect fixes will not be treated as change requests. TRL appreciates the importance of systematically controlling changes to baselines through well-defined change management procedures. TRL will clearly follow the criteria and procedures for the change management process so that all software

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Process Step	Role	Activity	Ticket Status
Case Closure Call/Email/Chat	TRL Support / client	Provides solution details and call or email client confirming their agreement to close.	Closed

Exclusions:

Maintenance service levels will have the following exclusions:

- Scheduled maintenance downtime as agreed by client
- Any downtime caused by the failure of network at client end
- Any downtime caused by SDC infrastructure
- Any outages of external services like unavailability of OpenStreetMap
- Time taken for the deferment period in case the Defect fixing is postponed in agreement with client for implementation at a later stage, in which case the resolution time will not be applicable.

Application Enhancement Process:

If client request is to enhance the product, TRL Support team will mark the request as an 'enhancement' in the tracking spreadsheet. Support team will analyse the change requests and estimate the effort, cost and timelines to develop and deploy the enhancement. This will be communicated with client and based on their approval further steps with respect to development & deployment of the enhancement will be taken up. For each enhancement, system requirement specifications (SRS) will be shared with client. After client approval of the SRS, TRL Support Team will start the development process. Release and closure of this enhancement request will be based on client communication.

Release Process:

TRL team will install the software including new versions, patches and hot-fixes in the server. For all releases except hot-fixes (which are urgent fixes), support team will inform client at least 2 weeks in advance. client will approve any exceptions to the above notice period. Hot-fixes are urgent requests from client, and will be prioritized appropriately for client release after confirmation from client. TRL support team will provide detailed 'Release Notes' once the release has been completed. This will be applicable for all releases including hot-fixes.

Status Reporting:

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lifecycle components such as requirements, design, source code, test data etc. are updated correctly.

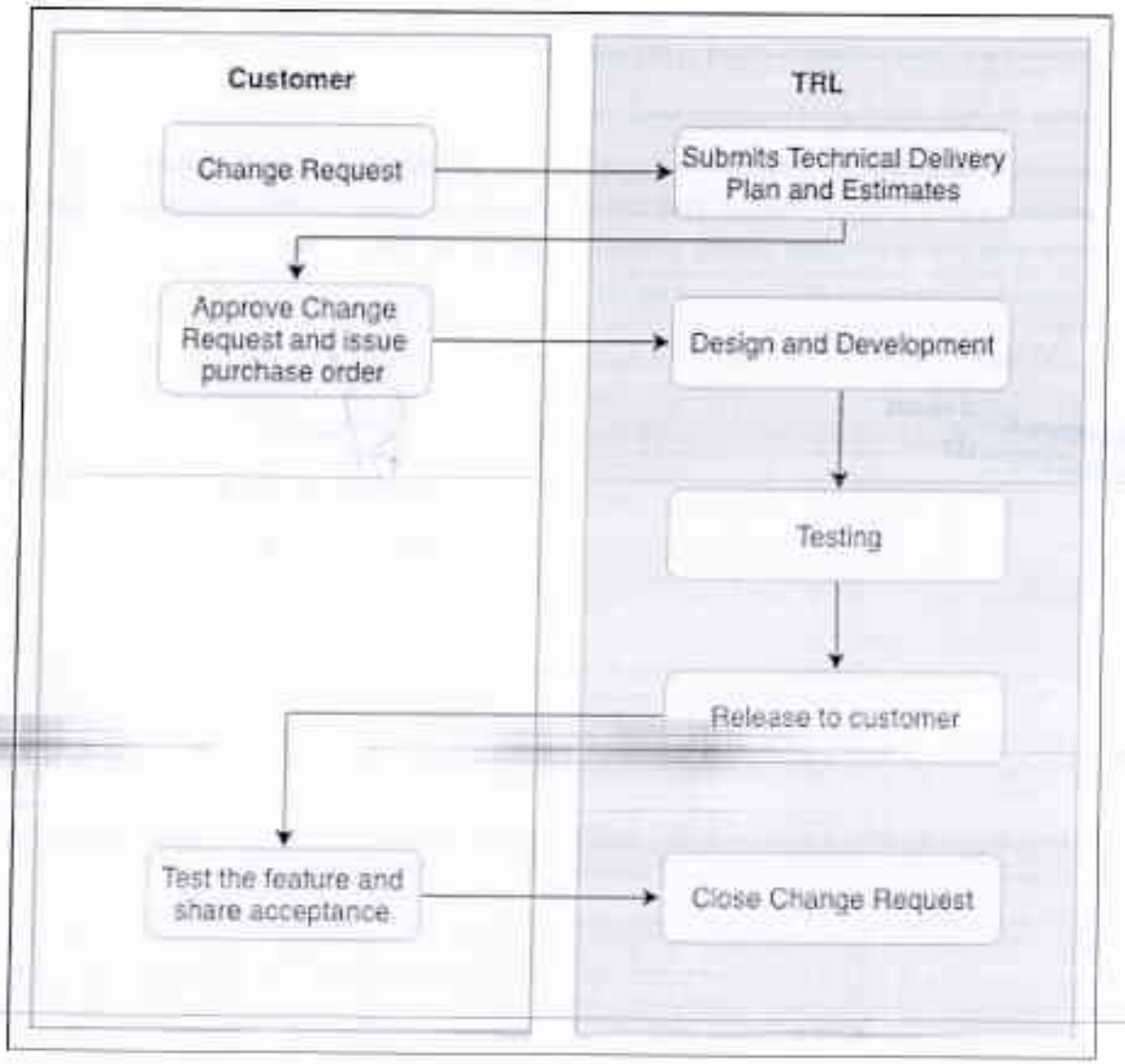


Figure 4-58 : Change Management Process

Set up Change Control Board:

A Change Control Board (CCB) will be set up in the project. The CCB will consist of Client Project Manager and TRL's Team Leader and other Technical members of the project. The CCB will evaluate the impact of any change in terms of functionality, effort, schedule and cost.

Change management during implementation:

At any time prior to the acceptance date as agreed, the Client may request or recommend changes to any part of the project or the deliverables to the Change Control Board. The change will be requested as a formal Change Request (CR). The CR will be evaluated by TRL

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and the impact in terms of functionality, effort and schedule will be communicated to the Client who will approve the CR before it is taken up for development by TRL. The required changes will be made in the impacted components and they will be base-lined after undergoing quality verification and validations.

Change management after implementation:

After implementation, the changes to the application will be managed by TRL's Maintenance Team through a Change Request (CR) process based on impact in terms of functionality, effort, cost and a schedule will be communicated to the Client who will approve the CR before it is taken up for development by TRL.

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4.4.8 Work Schedule and Planning for Deliverables

4.4.8.1 Work Schedule and Planning for Activity 1 – Project Inception

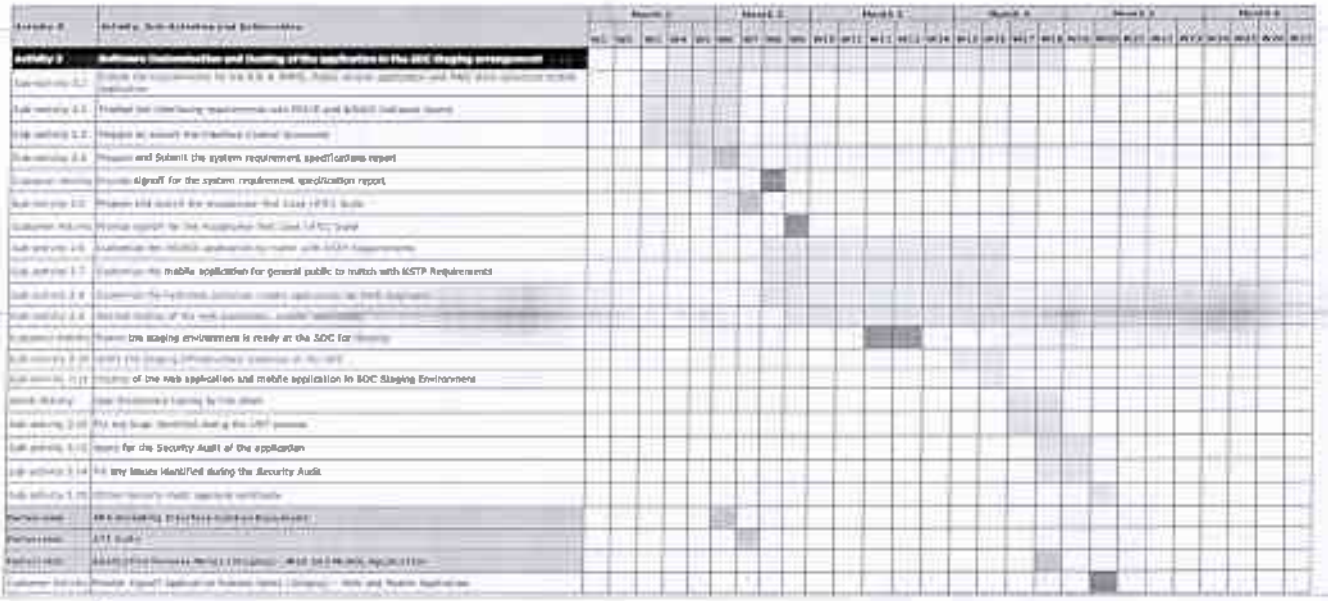


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4.4.8.2 Work Schedule and Planning for Activity 2 – Software Customisation and Hosting of the application in the SDC Staging arrangement



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Attachment 1 – Bidders

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4.4.8.3 Work Schedule and Planning for Activity 3 – Training and User Manual Preparation and Submission



4.4.8.4 Work Schedule and Planning for Activity 4 – Production Cut-over



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4.4 8.5 Work Schedule and Planning for Activity 5 – Software Support and Maintenance



Legend
Activities
Client actions
Control points
Contractor Support Team activities

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4.4.8.6 Software Support Maintenance Plan and Deliverables for the first 5 years:





4.4.8.7 Software Support Maintenance Plan and Deliverables for the subsequent 3 years:





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PROPOSAL

SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF A WEB BASED SOFTWARE SYSTEM FOR ROAD MAINTENANCE MANAGEMENT FOR THE KERALA PUBLIC WORKS DEPARTMENT

ATTACHMENT 5 – PROPOSED SUBCONTRACTORS

CLIENT

KERALA STATE TRANSPORT PROJECT
PUBLIC WORKS DEPARTMENT
GOVERNMENT OF KERALA

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5 Attachment 5 – Proposed Subcontractors 5-3

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5 Attachment 5 – Proposed Subcontractors

N/A

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ATTACHMENT 6 – INTELLECTUAL PROPERTY

CLIENT

KERALA STATE TRANSPORT PROJECT
PUBLIC WORKS DEPARTMENT
GOVERNMENT OF KERALA

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6 Attachment 6 – Intellectual Property.....6-3

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6 Attachment 6 – Intellectual Property

1. iROADS Software - iROADS is a sophisticated asset management and decision making tool for all infrastructure assets, delivering a single solution software tool for asset owners and operators. This is an existing proprietary software of which IP belongs to TRL. The details are available in the following link (https://trlsoftware.com/products/asset-management/iroads/).

2. iCAPTURE (iROADS mobile application including the public facing mobile application) Application- The iCAPTURE (iROADS mobile app including the public facing app) is an existing proprietary software of which IP belongs to TRL. The details are available in the following link (https://trlsoftware.com/products/asset-management/iroads/icapture/)

3. The table below lists out all the other software tools, libraries used for developing and deploying the iROADS system and iCAPTURE application. The software categorisation is assigned as per the definition provided in GCC Clause 1.1 (c). We had additionally included a column to define the licensing model of the software tools used.

Software Items	(select one per item)			(select one per item)		Is this open source software?
	System Software	General Purpose Software	Application Software	Standard Software	Custom Software	
Ubuntu 18.0.4 LTS	√			√		Yes
PostgreSQL 12.x		√		√		Yes
Apache Tomcat		√		√		Yes
GDAL		√		√		Yes
Python		√		√		Yes
GeoServer		√		√		Yes
Flask		√		√		Yes
Nginx		√		√		Yes

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Validate | Print | Help

Item Rate BoQ

Tender Inviting Authority: Project Director, Kerala State Transport Project

Name of Work: KSTP II :SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF A WEB BASED SOFTWARE SYSTEM FOR ROAD MAINTENANCE MANAGEMENT FOR THE KERALA PUBLIC WORKS DEPARTMENT

Contract No: KSTP-II – RMMS -01

Name of the Bidder/ Bidding Firm / Company :	TRL Professional & Software Services (India) LLP in JV with Experion Technologies (India) Private Limited

PRICE SCHEDULE

(This BOQ template must not be modified/replacec by the bidder and the same should be uploaded after filling the relevent columns, else the bidder is liable to be rejected for this tender. Bidders are allowed to enter the Bidder Name and Values only)

NUMBER #	TEXT #	NUMBER #	TEXT #	NUMBER #	NUMBER #	TEXT #
Sl. No.	Item Description	Quantity	Units	BASIC RATE In Figures To be entered by the Bidder Rs. P	TOTAL AMOUNT With Taxes	TOTAL AMOUNT In Words
1	2	4	5	13	54	55
1	KSTP II :SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF A WEB BASED SOFTWARE SYSTEM FOR ROAD MAINTENANCE MANAGEMENT FOR THE KERALA PJBLIC WORKS DEPARTMENT	1.000	lump-sum	45471352.000	45471352.000	INR Four Crore Fifty Four Lakh Seventy One Thousand Three Hundred & Fifty Two Only
Total in Figures					45471352.000	INR Four Crore Fifty Four Lakh Seventy One Thousand Three Hundred & Fifty Two Only
Quoted Rate in Words		INR Four Crore Fifty Four Lakh Seventy One Thousand Three Hundred & Fifty Two Only				

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ВЕЛИКОЛЕПНЫЙ
ДЕТЕКТИВ

Gmail

chief engineer <cepmtkstp@gmail.com>

KSTP-II –Supply, Installation, Testing and Commissioning of a web based software systemfor RMMS

16 messages

chief engineer <cepmtkstp@gmail.com> Tue, Nov 26, 2019 at 6:39 PM
To: gagan.virmani@lonrix.com, vivekhanandam.dpk@bentley.com, ganesh_deshmukh@bentley.com, jaimy.thomas@experionglobal.com, tmathew <tmathew@trl.co.uk>, rajasekhar@sriinfotech.com, rajesh.kr@taiseiint.com, pgvinod@algsurvey.com, ceo@algsurvey.com, rithin.a@esri.in, jojojose@panevniron.com, arun@citsat.com, radhakrishnan.l@ults.com

Sir,

The replies to queries received for the above assignment, the addendum and corrigendum to bidding documents are attached herewith. The same has been uploaded in the e-tender portal also.

With regards

Chief Engineer (Projects)

3 attachments

RMMS_Answers to Pre_Bid_queries.pdf
418K

RMMS_Addendum_Modified_Weightage.pdf
177K

Corrigendum.pdf
403K

Mail Delivery Subsystem <mailer-daemon@googlemail.com> Tue, Nov 26, 2019 at 6:38 PM
To: cepmtkstp@gmail.com

Address not found

Your message wasn't delivered to **jojojose@panevniron.com** because the domain panevniron.com couldn't be found. Check for typos or unnecessary spaces and try again.

The response was:

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Replies on pre bid queries for "Supply, Installation, Testing and Commissioning of a Web Based Software System for Road Maintenance Management for the Kerala Public Works Department, Bid Ref No.; KSTP-II-RMMS-01" - Nov'19

Sl. No	Description	Clause No.	Page No.	KSTP reply	Remarks
1	Can HSBC bank be included for online EMD payment	9.F	8	RFP prevails.	EMD payments are to be made through the e-payments system of etenders.kerala.gov.in portal. The Bidder can only use this for EMD payment and no additional Bank can be added to this.
2	Can the subcontractor OEM's credentials be considered in case the Prime is a different party	6.1 (a)	20	RFP prevails.	Kindly read clause 6.1 (a) in ITB & BDS. (For the purposes of establishing a Bidder's qualifications, and unless stated to the contrary in the BDS, the experience and / or resources of any Subcontractor will not contribute to the Bidder's qualifications; only those of a Joint Venture partner will be considered.)
3	Can the Subcontractor OEM partner with any number of bidders	6.4	22	RFP prevails.	Kindly read clause 6.1 (a), 6.4 & 28.1 in ITB & BDS. Cl-6.4 As long as in compliance with these provisions, or as long as unaffected by them due to not participating as Bidder or as partner in a Joint Venture, a firm may be proposed as a Subcontractor in any number of bids
4	Bid Processing and Bid Security fee: Demand Draft in favour of Managing	19.8 (a) an	36	"Managing Director, Kerala Medical Services Corporation Limited" shall be read as	

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Project Director K.S.T.P., PWD Trivandrum

	Director, Kerala Medical Services Corporation Limited, payable at Thiruvananthapuram - Please confirm.	d (b)		**"Project Director, Kerala State Transport Project "**	
5	Is Kerala PWD asking for total 5 years + 3 years of software cost to be included in the bid?	ITB 28.5/3. 4.1.c	55/156	Technical specifications 3.4.1 (a), (b) and (c) prevail	The Bidder has to quote his amount for the first five years and for the next three years service periods based on the requirements of the RFP clauses.
6	As this is QCBS based what is the ratio for Price: Technical capabilities?			ITB, BDS 28.4& elsewhere in RFP, The weight of the Price ("X" multiplied by 100 in the Evaluated Bid Score formula) = 0.52 *and that of technical is 0.48*	
7	Do the exchange of data from the PRICE and WINGS Software is unidirectional or bi-directional	3.1.3	152	Bi-directional	As per clause 3.1.3 of technical specification "The RIS&RMMS system shall be such that, it shall be capable of exchanging data and information in the required format to other software systems of Kerala PWD like PRICE software, WINGS portal etc upon request from such systems..." To exchange data, the system shall also receive some data from the other systems to provide an appropriate reply.
8	Please share department specific workflows	3.1.7	152	Kerala PWD has a defined official hierarchy from Chief Engineer to Assistant Engineer. The Bidder shall get a general idea of such hierarchy and workflow for approvals through enquiry.	

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Trivandrum

				Department specific workflow will be given during the process of installation and customizations.	
9	Is it desired by the department to have unlimited users only to access inspection app?	3.3.4	156	Not only to the field inspection apps or the general app but also in the RMMS system, there shall not be any restriction on the user numbers	Currently PWD is having about 7000 employees out of which the Roads wing, Maintenance wing and Administration wing Engineers may be using the RMMS system. Hence, in general, the maximum users in the RMMS system at a time may not exceed 600.
10	As part of this bid is the bidder expected to supply the database	3.4.2	157	The bidder shall supply all software components including DBMS for the successful working of his system and shall also provide for its updates and upgrades during the service period.	
11	As the installed RIS and RMMS systems are COTS based the intellectual property rights will be the OEM where as configuration done will be specific to the department and can be handed over Please confirm	3.4.5/ 3.4.8	158	Clause 3.4.5 of Technical specifications stands modified as under " The Bidder shall handover the complete set of final executable installation files(with license keys) of the installed RIS & RMMS system and all mobile apps including that for all supporting third party software with license keys to the KSTP or e-Governance Cell of PWD after the completion of user acceptance testing and hosting at the designated location. In case, any later customizations or updation were done,	

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				the updated executable installation code shall also be submitted after the updations were affected. The bidder shall also handover documentation regarding installation notes, configuration adjustments and procedure of installing the system using the installation files provided by him." Clause 3.4.8 of Technical specifications stands modified as under "If any customized application or mobile app is developed exclusively for PWD which are not covered under the COTS and the Intellectual Property rights of the Bidder/OEM, the bidder shall provide the complete source code and executable installation code of such apps or applications to KSTP/e-Governance Cell of PWD KSTP after the completion of installation of such application or its customizations done at a later date."	
12	How Many numbers of authorized users will access the RIS and RMMS system from department?	-	-	As per Sl.No-9	As per Sl.No-9
13	What type of Database exists with the department?	-	-	The Department is not having any database as far as RIS & RMMS system is concerned. However, the Department is having	

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				asset database as part of the PRICE software.	
14	During the past five (5) years we had implemented the similar systems across Africa and Europe region. Can you please let us know whether we shall apply for the bid based on our international experience?	ITB 6.1(a)	50	Yes, the international experience shall count.	
15	We shall develop a mobile application which will work in both Android and iOS phones. The users can install the application in their mobile phones and use it for data collection. Can you please confirm whether this is fine?		150	Yes, but subjected to clause 3.3.6 and 3.4.8 of technical specification	
16	The proposed system will work on the Microsoft Edge, Google Chrome, Safari and Mozilla Firefox browsers in Windows, Linux and Mac operating systems. Can you please confirm this is fine?	TS-3.1.1	151	Confirmed that standard web browser means Microsoft Edge, Google Chrome, Safari and Mozilla Firefox browsers in Windows, Linux , android and Mac operating systems	
17	1. Can you please confirm 'PRICE' and 'Wings' are the only systems to be interfaced (or) do we need to interface with more such systems? If yes, can you please share the details? 2. Can you please let us know whether the data exchange should be two way? or it is always that the RIS&RMMS system	TS-3.1.3	152	1. PRICE and WINGS are the two systems of PWD where the data from the RIS & RMMS system may be used. 2. As given in Sl.no-7	

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	will supply data to the 'PRICE' software and 'Wings' portal?				
18	Can you please confirm by streaming you meant that the system should have the ability to playback the photos, videos and drone data stored in a centralised storage and not the live/real time streaming of the data received from devices/drones?	TS 3.1.6	152	No live streaming of data is proposed, only stored data is to be streamed	
19	What level of application control is anticipated? Does this involve MDM features like remote locking of the device, remote wiping of data etc? Please confirm.	Ts-3.1.7	152	No MDM or device level control proposed. The system shall be such that the use of the apps is controlled by the centralized system using user authorisations and logins	
20	The system shall be capable of affecting any customisations regarding this at a later stage based on the input from the RMMS Consultants This statement is not clear to us. Can you please clarify?	TS-3.1.12	152	The clause TS-3.1.12 states that the system shall have the capability to generate input data to be used in the modelling engines like HDM-4 to generate climate and disaster resilient models for future projections. The system shall be capable of affecting any customisations regarding **the input data generation for usage by modelling engines** at a later stage based on the input from the RMMS Consultants	Climate resilient construction and budgeting is proposed to be adopted in light of the recent flood and landslides in Kerala. This needs the climate and disaster related data and suitable modelling. Climate and disaster resilient models for future projections would be finalised later with the help of RMMS consultant. The RIS & RMMS system shall be able to generate input data files for such modelling engines in the required format and if any interventions are required to be done at this stage shall be done by the Bidder in terms of input data file generation. The department shall supply

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					the required data.
21	It is mentioned that 'specific road asset information can be disseminated to the public in a controlled way'. 1. Do we need an option in the system to mark whether the information regarding that specific asset can be shared with public or not? 2. Also, does controlled way mean to have an option to push/show the information to only a certain group of public users?	TS-3.1.13	154	RIS & RMMS system will be having a lot of data related to different attributes of a road asset which will be used by HDM-4 software. Many of such data may not be of useful for general public and hence the controlled way means the system shall be capable of disseminating information/ data on selected attributes or time series data to general public through the general app.	There shall be no grouping of public users
22	We assume the costs for publishing the application in play store and app store will be managed by the client. Please confirm.	TS-3.1.13	154	The bidder shall bear the costs for publishing the application in play store and app store and shall separately indicate such costs in the technical& financial bids	
23	Do we need to any preliminary checks/quality validations before uploading the data to central server? This is recommended, since this is a public facing app, and the user can upload some invalid data/malicious contents, etc? Please confirm.	TS-3.2.4	155	There shall be facility for validations of uploaded data before storing in the central database. There shall also be moderation of complaints or queries and only permitted/valid complaints or queries shall be send for further processing	Detailed functional and system specifications shall be finalised later in the implementing stage

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24	In Section - C Scope of Services, it is mentioned that the Consultant shall configure and supply their commercial off the shelf system for Kerala PWD for this project. Since, the Consultant is configuring their existing commercial off the shelf product for this project, we would not be able to share the IP of the product. However, we are ready to share the source code with e-Governance Cell of PWD, with secure code sharing arrangements like Escrow. Please confirm.	TS-3.4.5	158	Replied vide Sl. No-11	
25	We shall share the training materials with relevant authorities. We think the integration of the training material within WINGS software should be carried out by the WINGS Software maintenance team/or other responsible teams within PWD as we are unaware about the technology and architecture of the WINGS system. Please confirm	TS-3.7.5	160	The integration of the training material within WINGS software will be carried out by the WINGS Software maintenance team/or other responsible teams within PWD.	
26	any GIS layers shared with other applications shall be interfaced with web-GIS application By web-GIS application, we trust you mean the RMMS. Please confirm.	TS-3.8.4	161	In case, if any GIS layer data or any other asset attribute data from the RIS & RMMS system is to be shared with other applications, then these data shall be provided with its GIS related values(geo-coded) so	

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				resilient road asset construction, management and budgeting. All such data need to be displayed on the GIS interface provided the attribute data is given geo-coded	
30	Interfacing with HDM-4 model shall be fine as it is standardised. But, interfacing with Non HDM4 models without knowing the details shall be difficult. Can you please share more information on the number of other models you would like to interface, their technical details/capabilities etc. This shall help us estimate the work involved in this.	TS-D.q	165	The Bidder is expected to have knowledge about other non-HDM-4 models used and the COTS software is expected to have the built in ability for interfacing with non-HDM -4 models. Which non-HDM-4 models would be used in this project shall be decided later by the RMMS consultant and the Bidder shall be able to customise the system according to this.	
31	The reset password functionality shall be available only for the user accounts which are created locally in the RIS & RMMS system. The reset password functionality shall not be available for the SSO users. Please confirm.	TS-D-1	166	Here the role specified is Super Admin. The super admin shall have this privilege so that he can reset the password for any user.	
32	The system shall support the data upload using vector/shape file. We think the digitizing of the data from overlaid image should be done outside of the RIS&RMMS system. Once the data is prepared in vector/shape file format this shall be	TS-D-2	166	The system shall have the capability of Creating Road or other asset(shapes) by either copying from external vector/shape file or digitizing overlaid image	

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				that the receiving applications shall be able to display the data through the medium of web-GIS	
27	Google maps cannot used freely in commercial applications. If KSTP procures the license for google maps we can integrate the google maps in the system.	TS-D(o)	164	The applications or app proposed are not commercial applications and as per the Google "Fair Use" policy and if free use is permitted by Google Maps terms of service, we may explore the possibility of providing Google Maps as a base layer just for reference purpose similar to other free maps like openstreet map etc. However, if any paid licence is to be obtained, KSTP shall decide on this in the implementation stage and bidder is not required to get any paid licences from Google Maps.	The app shall have facility to select a base map from a list of maps like Google Map, Openstreet map etc. Tiled image layer is to be shown as base layer with openstreet map can be default.
28	Are you expecting that the proposed system shall perform climate forecasting information? The system shall display the forecasting data if the forecasting data is available in electronic format with proper GIS information. Please confirm.	TS-D p (i)	165	Climate forecasting is out of the scope of this project.	
29	show historical data on the disaster and the impact that caused; Can you please add more details? Does this data need to be displayed on the GIS interface?	TS-D p (ii)	165	The system shall be able to take, store, retrieve and output the attribute data on a disaster and its impact relevant in terms of road asset management. The Bidder is required to have knowledge on this especially related to climate and disaster	

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	uploaded back to the system. Please confirm.				
33	Kindly confirm, if Demand Drafts for Bid Processing fee and Bid Security are required in favour of "Managing Director, Kerala Medical Services Corporation Limited".			Replied vide Sl No-4	
34	The bid document does not specify any positions or man-months for the Key Personnel. We request the authority to provide a list of key personnel with their minimum man-months required for this project so that all the bidders are on same level in their assessment of number of key personnel and their man-months. Kindly consider.	3. 5.6	218	This is not a consultancy type project, but a COTS software supply, installation, customisation and support service project. The key personnel required for contract management and implementation from the Bidders side need only to be given in the prescribed forms under Section-VII- 3.5.6	
35	As COTS is proposed no Source Code shall be provided. Only License and installation files shall be supplied. Kindly confirm.	GCC12.1	135	Please see the reply of Sl.No-11 Based on this item No-3 of payment terms is modified as "Completion of compliance testing and approval of reports with production of security audit certificates and hosting in live or production environment so that the entire system with mobile app for public and field data collection apps is ready for usage. Submission of all installation codes of RIs & RMMS system and field apps with relevant	

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				licensing keys"	
36	Without AMC how we can provide the software updates free of cost. Kindly advise.	GCC 23.4	95	AMC is provided in this Bid. Please read Technical specifications, Bid Data sheet, SCC & elsewhere in RFP.	
37	Item (a) to (f) of the Scope of Services suggests to supply the COTS system with all necessary supporting software installations kindly confirm the following:- i) It is assumed that IT infrastructure (Hardware) available with SDC will be utilised. If any, shortcoming the additional hardware will be procured by PWD. Kindly confirm. ii) Who will provide Operating System Software Licenses? Kindly advise. iii) It is assumed that PWD shall provide the required number of HDM-4 software licenses. Kindly confirm.	Item (a) to (f)	150	i. Confirmed ii. The bidder shall provide for all software related requirements including that of third party software iii. confirmed	
38	We request the authority to relax condition of demonstrating 5 such mobile apps to 2 mobile apps. Kindly consider.	TS-3.3.6	156	No change in this condition.	
39	As COTS is being proposed for RIS & RMMS System. Source Code can't be provided. Only the installation files, Licenses will be provided. Kindly confirm.	TS-3.4.5	157	Clarified vide Sl.No-11	
4	In the scope of	TS-3.4.6	158	No change in this	

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0	services, it is requested to provide 50 copies of user manuals. This requirement is very high, as all user manuals will be available under Help menu of the system hard copies are not advisable and as and when any functionality changes the updated version will be uploaded to System. Printing these every time is a cumbersome and it is difficult for user to maintain the versions etc. as an initial deliverable 5 copies are advisable. Kindly confirm.			condition.	
41	Total Number of people to be trained or frequency of training is not clear. For estimation purpose can we assume around 50 members twice a year. Kindly clarify.	TS-3.7.6	160	Please see the clarification given in Sl No 9. Initially you have to train about 600 personnel. After the initial training got completed and the system usage becomes stable, the subsequent training needs would be reduced to say 25 to 30 persons quarterly.	
42	Kindly advise, who will provide the climate and disaster related data along with historical data.	TS.D.(p)	164	The department/KSTP shall provide all type of data	
43	Please clarify the total no of Web GIS editors & total no of concurrent Web GIS users.	TS-D-3.1	151	Please see the clarification given in Sl No 9. Network editing and data modifications shall be done based on user authorisations and approval workflows.	
44	Please provide the total number of mobile users	Ts-3.2	154	This is a mobile app for general public use	

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	expected.				
45	Third Party insurance amended to be Rs.12 Million	GCC 37		No change	
46	The performance based Bank Guarantee amended to be 6%	GCC-13.3	136	No change	
47	please allow for 40 days time from dale of announcements of pre bid clarifications for submission of the bid instead of the current published date	ITB-21.1	53	last date of bid submission is extended up to 16-12-2019	
48	Can a Bidder sub-contract its obligations to an OEM so far as the sale of software licenses is concerned.	ITB-6.1(C)	20	Bidder shall be responsible for all OEM & software licences	
49	Suggesting considering OEM's/Subcontractor s Credentials as credentials of the prime bidder in case OEM participates in the bid as subcontractor to the prime bidder. Please confirm	ITB-6.1(a)	20	As per ITB-6.1(a), For the purposes of establishing a Bidder's qualifications, and unless stated to the contrary in the BDS, the experience and / or resources of any Subcontractor will not contribute to the Bidder's qualifications; only those of a Joint Venture partner will be considered	
50	Suggesting considering OEM/Subcontractors should be allowed to bid through more than one Prime bidder.	ITB-6.4	22	No change	
51	Please confirm whether the Demand Draft needs to be drawn in favour of Managing Director, Kerala Medical Services Corporation Limited, payable at	ITB-19.8	36	Clarified vide Sl.No-4	

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	Thiruvananthapuram				
52	Please confirm whether any different licensing and maintenance/support terms (including different terms with respect to IP ownership, indemnification for third party IPR breach, proposed allocation and/or limitation of liability as well as deviations to warranties) which the OEM may propose and which enable the Purchaser to utilize all of OEM's available licensing benefits and privileges would be considered as material deviation for the purpose of this Tender.	ITB-26.4	39	The Bidder shall be responsible for all licensing and maintenance support and no condition shall be allowed in this case.	
53	Please clarify as to why the inspection of Supplier's offices and accounts bank records of the Supplier would be required under this contract. Kindly clarify the purpose behind the inspection of accounts and records of sub-contractors under this contract.	GCC-9.8	77	This is a World Bank aided project and no change of this clause.	As per World bank procurement documents
54	Please clarify as to what will be the scope and ambit of Audit for standard software under this clause.	GCC-16	84	This clause is regarding the software licence agreements whereby the Supplier grants to the Purchaser license to access and use the Software, including all inventions, designs, and marks embodied in the Software. The audit is to	

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				verify compliance with the license agreements	
55	Please clarify whether cap on liabilities of parties under clause 33.1 (b) would also be applicable to clause 9.5 (Indemnity for violation of laws) clause 36.2 (For loss of or damage to property or injury to workers) of the General Conditions of Contract	GCC-33	108	Not applicable to clause 9.5 and 36.2	
56	Please clarify as to which procurement guidelines is being referred under this clause. Kindly provide the same.	GCC-1.1	132	Kindly refer to the IFB point-4 on page 7/256 & elsewhere in the RFP.	
57	We understand that under this clause, no software escrow contract is required for execution of contract, however, the "Note" states special software escrow arrangement are needed in supply of Software particularly Application Software. Please confirm the kind of software (as defined under tender) on which the requirement of special software escrow arrangement will be applicable.	GCC-15.5	139	"Note" portion stands deleted.	
58	Also, note the title and source code of the standard software (COTs) is always vested with the OEM Please note that the license to access and use the Software shall in accordance with	GCC-16	83 & 140	Clarified as per Sl.No-11	

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	OEM's software license and maintenance and support agreement. Please re-confirm this understanding				
59	Does the exchange of data and information from the PRICE and WINGS Software is unidirectional or bidirectional? Please specify what all data and information needs to be exchanged and integrated with RIS and RMMS System	TS-3.1.3	152	Clarified as per Sl.No-7. The data which are to be interchanged between systems will be finalised during the installation and customisation stage	
60	Please specify exact number of authorized RIS and RMMS users that will be using apps	Ts-3.3.4	156	Clarified vide Sl.No-9	
61	Does the bidder need to submit separate costs of licensing for 5 years and then for each successive years up to three years?	TS-3.4.2(c)	157	Yes. For bidding procedure, kindly refer to the parts B,C& D of ITB & BDS & elsewhere in the RFP.	
62	Also, note the title and source code of the standard software (COTs) is always vested with the OEM Please note that the license to access and use the Software shall in accordance with OEM's software license and maintenance and support agreement. Please re-confirm this understanding.	TS-3.4.5 & TS-3.4.8	158	Clarified vide Sl.No-11	
63	Will State Data Center provide DBA to carry out day to day activity of creating data backup and recovery?	TS-3.5.1	158	SDC provides infrastructure only.	
6	Suggest limiting the	TS-3.6.3	159	Such kind of limit cannot	

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4	scope of the data transformation from RMMS to HDM4 and vice-versa annually. Please confirm.			be set except as stated in this clause. The Bidder has to support the department in case of any errors or technical problems apart from training requirements	
65	Suggesting that these 5 engineers have skills of DB/SQL, GIS, and other IT related activities. Please confirm.	TS-3.7.2	160	Engineers shall be having adequate computer & IT related knowledge	
66	Does the exchange of data and information from the PRICE and WINGS Software is unidirectional or bi-directional? Please specify what all data and information needs to be exchanged and integrated with RIS and RMMS System	TS-3.8.4	161	Clarified vide Sl No-7and 59	
67	Suggesting removing Google maps and replacing with Open Street Maps. Please confirm		164	Clarified vide Sl No-27	
68	Suggest limiting the scope of storage of Climate and disaster related data into the system. Please confirm		164	No change in these conditions.	
69	Please provide scope of this particular work and confirm to us that department will be providing inventory as well as conditional data and the frequency of data collection and frequency of reporting	4(2)	164	This is only bridge and culvert information where it's one time inventory details and condition inspection data (minimum twice in an year) are to be stored. The department will provide the data	
70	Suggesting classifying separate items for Product and Services	BOQ_427784		The bidders can fill their final bid amount through the attached excel file at	

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	in the BOQ sheet. Please confirm			the column no 13, which shall be reflected in column 54 in the BOQ table. Rest of many forms shall be duly filled up as per the section VII requirements & shall be uploaded onto the e-tendering web site together with the attached BOQ excel file.	
71	As this QCBS tender please confirm the ratio of Price: Technical			Kindly refer to ITB & BDS 28.4 & elsewhere in the RFP.	
72	Suggesting extending the bid submission date to 15th December • Please confirm.			Clarified vide Sl.No-47.	
73	Request to kindly allow consortium bids			RFP prevails.	

19/11/2019

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DARLENE CARMELITA D'CRUZ
CHIEF ENGINEER

Project Director
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KSTP addendum on pre bid queries for "Supply, Installation, Testing and Commissioning of a Web Based Software System for Road Maintenance Management for the Kerala Public Works Department, Bid Ref No.; KSTP-II-RMMS-01" - Nov'19

Sl No	Clause no & page no	Categories	features to be evaluated	Maximum Technical score	Weight of category	Modified Weight of Category	Remarks
1	ITB 28.5 Page no 55/256	RIS & RMMS SYSTEM	Web based client server architecture	10	0.67	0.50	The technical evaluation categories and the features to be evaluated stands modified to this extend
			easily customisable or modifiable Module based	10			
			data interchange using web service architecture	10			
			Contains RIS, TIS,RMMS, Bridge&culvert information system, HDM-4 output generation and capability for using other pavement management systems, analysis tools and decision tree logics	25			
			capability of using data from automated survey vehicles in all standard formats	10			
			Whether the proposed system is fully in compliance with the minimum functional requirements specified in the Technical	25			

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		specification				
		Whether the proposed system has the ability for graphical and GIS based visualization of all types of data and availability of various types of analytical and modelling tools	20			
		ability to receive and use various types of climatic and environmental data concerned with road asset management	10			
		ability to take, visualise and use data from android/ios mobile apps efficiently and effectively	10			
		Provision of general mobile app for asset information for public with facility for complaints reporting in conformity with the requirements vide Task-2 of technical specifications	10			
		Provision of field inspection mobile apps for asset information and data collection for PWD Employees in conformity with the requirements vide Task-3 of technical specifications	10			

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WEB SERVERs AND DBMS	usage of open source platforms for web servers, GIS servers and database management	25	0.33	**0.25**	
	data handling capabilities and speed of processing digital data and streaming digital content such as photos, videos, drone data etc	10			
	Data archiving capability and efficiency	10			
	Integration of mobile apps with the central database	10			
	Licensing requirements of all third party software and submission of detailed plan of such licensing requirements and costs for the five year warranty period and three year additional period (in compliance of Task-4)	20			
General terms complains reg hosting, training, software customisations	Whether the details required to be given as per Task-5,6, 7 and 8 were given/is willing to abide with any conditions put forward	15	0.27	**0.04**	
warranty and support period	whether the costing for support during the first five year period and the next	10	0.05	**0.21**	

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			three year period is given with reasonable explanations and manpower requirements				

19/11/2019

DARLENE CARMELITA D'CRUZ
CHIEF ENGINEER

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SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF A WEB BASED SOFTWARE SYSTEM FOR ROAD MAINTENANCE MANAGEMENT FOR THE KERALA PUBLIC WORKS DEPARTMENT.

Addendum – 2 to Bidding document

Sl. NO.	CLAUSE	EXISTING	TO BE READ AS
1	19. Bid Processing fee and Bid Security of the ITB	19.1 The Bidder shall furnish as part of its bid, the requisite bid processing fee and a Bid Security, as **specified in the BDS.** 19.2 The requisite bid processing fee has to be paid in the method as detailed in Clause 21.3 hereunder. The minimum amount of Bid processing fee and bid security shall be paid online and the balance amount shall be paid off-line through financial instruments as detailed in Clause 21.8 hereunder. 19.3 The minimum amount of bid processing fee and Bid Security shall be paid on-line in the e-portal. The balance amount, if applicable shall be submitted to the Head Office of the Tender Inviting Authority before the opening of tender. The minimum amount for bid processing fee is Rs. 472/- and the minimum amount for bid security is Rs. 1,500/-. The Bid processing fee and Security shall be in the amount specified in the BDS andshall be denominated in Indian Rupees. If the bidder offers more than one item mentioned in BDS, the total cost of bid processing fee and bid	19.1 The Bidder shall furnish as part of its bid, the requisite bid processing fee and a Bid Security, as **specified in the BDS.** 19.2 The Bidder shall furnish as part of its bid, the requisite bid processing fee and a Bid Security, as **specified in the BDS.** 19.3 The Bidder shall furnish as part of its Technical Part of the bid, a scanned copy of the bid security in the amount **specified in the BDS**. The original of the Bid Security shall be submitted in accordance with the procedures **specified in ITB 20.4 below.** 19.4 The Bidder can download the bidding document from the Procurement Portal after registering on the portal. Registration in the portal will be free of cost. However, non-refundable amount of Rs.9028/- towards bid processing fee is payable by those bidders who would like to submit the bid, through Demand Draft drawn on any Scheduled/Nationalized bank, payable at Thiruvananthapuram, in favour of Project

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Sl NO.	CLAUSE	EXISTING	TO BE READ AS
		security mentioned against each item shall be paid, failing which the offer will not be considered. 19.4 **On-line submission of minimum amount of Bid processing fee and bid security:** The bid processing fee and bid security can be paid in the following manner through e-Payment facility provided by the e-Procurement system:	Director, KSTP. The Demand Draft should be submitted along with other original documents as mentioned in Clause 8 of ITB, before the deadline for bid submission in the manner specified in BDS If a bid security is specified pursuant to **ITB 19.1**, the bid security shall be a demand guarantee in any of the following forms at the Bidder's option: (a) an unconditional guarantee issued by a Nationalised/ Scheduled bank located in India; (b) an irrevocable letter of credit issued by a Nationalised/ Scheduled bank located in India; (c) a cashier's or certified check or demand draft issued by a Nationalised/ Scheduled bank located in India; or In the case of a bank guarantee, the bid security shall be submitted using the Bid Security Form included in Section VII, Bidding Forms. The form must include the complete name of the Bidder. The bid security shall be valid up to twenty-eight (28) days after the end of the bid validity period and bids with a bid security valid for lesser periods shall be rejected as non-responsive

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S/d

Project Director

Kerala Public Works Department
Kerala State Transport Project (KSTP)
Project Management Team
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File No: KSTP/1754/2019-AE6

13.05.2020

To,

M/s TRL Professional & Software Services (India) LLP
E-277, Greater Kailash-1
New Delhi-110048
Email: enquiries@trl.co.uk

Sir,

Sub: KSTP II- Supply, Installation, Testing and Commissioning of a Web based Software System for Road Maintenance Management for the Kerala PWD – Notice of award-reg.

Ref: *1) This office letter of even no. dated 08.05.2020*

2) Your email dated 11.05.2020

Vide reference 1st cited above, it was informed that your proposal for "Supply, Installation, Testing and Commissioning of a Web based Software System for Road Maintenance Management for the Kerala PWD" has been accepted for an amount of Rs 4,37,04,162/- (Rupees Four Crores Thirty Seven Lakhs Four Thousand One hundred and Sixty Two only).

But vide reference 2nd cited, you have pointed out a mistake in the accepted price, which was then perused and the accepted price is hereby corrected as Rs. 4,54,71,352/- (Rupees Four Crores Fifty Four Lakhs Seventy One Thousand Three Hundred and Fifty Two only)

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

000556

Project Director
K.S.T.P., PWD
Trivandrum

In this regard, you are requested to attend this office along with Non-Judicial Stamp Paper (Purchased from Kerala) worth Rs.45,500/- (Rupees Forty Five thousand Five hundred only) for executing the agreement for the subject consultancy services as soon as practically possible, but no more than twenty-eight (28) days following receipt of notification of award. You shall furnish a Performance Security for an amount of Rs.28,33,748/- (Rupees Twenty eight lakhs thirty three thousand seven hundred and forty eight) in accordance with the GCC, using the Performance Security form provided in the Bidding Documents.

Yours Faithfully,

Chief Engineer (Projects)

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

000557

Kerala Public Works Department
Kerala State Transport Project (KSTP)
Project Management Team
T.C. 11/339, Sree Bala Building
Keston Road, Nanthancode, Kowdiar.P.O
Thiruvananthapuram – 695003

Tel (Direct): 00-91-471-2318946
Telefax: 00-91-471-2318958
00-91-471-2318985
e-mail: pdkstp@gmail.com
cepmtkstp@gmail.com
www.keralapwd.gov.in

File No: KSTP/1754/2019-AE6

08.05.2020

NOTIFICATION OF AWARD

To,

M/s TRL Professional & Software Services (India) LLP
E-277, Greater Kailash-1
New Delhi-110048
Email: enquiries@trl.co.uk

Sir,

Sub: KSTP II- Supply, Installation, Testing and Commissioning of a Web based Software System for Road Maintenance Management for the Kerala PWD – Notice of award-reg.

Ref: *Your proposal dated 23.12.2019*

With reference to the above, it is informed that your proposal for "**Supply, Installation, Testing and Commissioning of a Web based Software System for Road Maintenance Management for the Kerala PWD**" for an amount of Rs.4,37,04,162/- (Rupees Four Crores Thirty Seven Lakhs Four Thousand One hundred and Sixty Two only) is hereby accepted.

In this regard, you are requested to attend this office along with Non-Judicial Stamp Paper (Purchased from Kerala) worth Rs.43,750/- (Rupees Forty Three thousand Seven hundred and Fifty only) for executing the agreement for the subject consultancy services as

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

000558

Project Director
K.S.T.P., PWD
Trivandrum

soon as practically possible, but no more than twenty-eight (28) days following receipt of notification of award. You shall furnish a Performance Security for an amount of Rs.28,33,748/- (Rupees Twenty eight lakhs thirty three thousand seven hundred and forty eight) in accordance with the GCC, using the Performance Security form provided in the Bidding Documents.

Yours Faithfully

Chief Engineer (Projects)

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

Gmail

chief engineer <cepmtkstp@gmail.com>

Supply and installation of RMMS Software - Clarification to bidding documents

3 messages

chief engineer <cepmtkstp@gmail.com> Tue, Mar 10, 2020 at 5:26 PM
To: tmathew <tmathew@trl.co.uk>

Sir,

Please find attachment

with regards

CE (Projects)

trl.PDF
34K

Mathew, Tony <tmathew@trl.co.uk> Tue, Mar 17, 2020 at 5:14 PM
To: chief engineer <cepmtkstp@gmail.com>
Cc: "Vadgama, Sanjay" <svadgama@trl.co.uk>, "Kamal, Subu" <skamal@trl.co.uk>, Binu Jacob <binu.jacob@experionglobal.com>, Jaimy Thomas <jaimy.thomas@experionglobal.com>

Dear Ma'am,

Trust you are doing well.

Please find attached the following information you have requested to furnish:

- Client certificates (apart from the certificates already submitted with the bid)
- Litigation History – TRL & Experion (We both companies doesn't have a litigation history with the client organisations, we have made a declaration to this effect)
- Details of Current Commitments - Experion

We are collating information related to the current commitments of TRL. Some of our personnel are affected due to Coronavirus scare. Sorry for the delay, we will send the details tomorrow.

Assuring you the best of our services,

Kind Regards

Tony Mathew

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

000560

Project Director
K.S.T.P., PWD
Trivandrum

Tony Mathew
Principal Transport Specialist

DD: +44 (0)1344 770750 | M: +91 9711806692 | E: tmathew@trl.co.uk
TRL | Crowthorne House | Nine Mile Ride | Wokingham | Berkshire | RG40 3GA | United Kingdom

TRL THE FUTURE OF TRANSPORT

From: chief engineer <cepmtkstp@gmail.com>
Sent: 10 March 2020 11:57
To: Mathew, Tony <tmathew@trl.co.uk>
Subject: Supply and installation of RMMS Software - Clarification to bidding documents

This Message originated outside your organisation.

Sir,

[Quoted text hidden]

Emails and their contents may be monitored for the purposes of quality control, fact checking and training
This email, together with any attachments, is confidential and may be privileged. If you have received it in error, please notify the sender and delete it.
Please click here to view the TRL Privacy Notice.
TRL Limited, registered in England, No. 3142272, registered office: Crowthorne House, Nine Mile Ride, Wokingham, RG40 3GA, UK. VAT Registration 664 625 321

3 attachments

Client Certificates.7z
2688K

Table 3.5.4_Current Contracts Info_Experion - Copy.pdf
197K

Table 3.5.8_Litigation History.pdf
119K

Mathew, Tony <tmathew@trl.co.uk> Thu, Mar 19, 2020 at 10:50 AM
To: chief engineer <cepmtkstp@gmail.com>
Cc: "Vadgama, Sanjay" <svadgama@trl.co.uk>, "Kamal, Subu" <skamal@trl.co.uk>, Binu Jacob <binu.jacob@experionglobal.com>, Jaimy Thomas <jaimy.thomas@experionglobal.com>

Dear Madam,

TRL PROFESSIONAL SOFTWARE SERVICES (INDIA) LLP

000561

Project Director
K.S.T.P., PWD
Trivandrum

Following our below email, please find attached the details of current commitments of TRL, where software team is involved.

Trust this will complete the requirements for additional information related to Kerala RMMS bid. Should you need any additional information, please let me know.

Assuring you the best of our services,

Kind Regards

Tony Mathew

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[Quoted text hidden]
[Quoted text hidden]

Table 3.5.4_Current Contracts Info_TRL.pdf
128K

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

000562

Gmail chief engineer <cepmtkstp@gmail.com>

Supply, Installation, Testing and Commissioning of a Web based Software for RMMS for KPWD - extension of bid validity - reg.

5 messages

chief engineer <cepmtkstp@gmail.com> Sat, Apr 18, 2020 at 12:50 PM
To: info@satragroup.in, gagan.virmani@lonrix.com, tmathew <tmathew@trl.co.uk>, balakrishnay@satragroup.in

Sir,

Ref: Bid Identification No.: KSTP-II-RMMS-01

The validity of the bids submitted by your organisation for the above assignment will expire on 21-04-2020. Hence you are requested to extend the validity of your bids to another 45 days from the current expiry date.

With regards

Chief Engineer (Projects)

Tony Mathew <tmathew@trl.co.uk> Mon, Apr 20, 2020 at 10:55 AM
To: chief engineer <cepmtkstp@gmail.com>

Dear Ma'am,

Thanks for the email.

We are happy to extend the validity of the TRL bid (bid identification no. KSTP-II-RMMS-01) for another 45 days, i.e., up to 6 June 2020. Please consider this email as our confirmation of the extension of TRL bid validity until 6 June 2020.

Assuring you the best of our services,

Kind Regards,

Tony Mathew
Principal Transport Specialist

DD: +44 (0)1344 770750 | M: +91 9711806692 | E: tmathew@trl.co.uk
TRL | Crowthorne House | Nine Mile Ride | Wokingham | Berkshire | RG40 3GA | United Kingdom

TRL THE FUTURE OF TRANSPORT

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

000563

Project Director
K.S.T.P., PWD
Trivandrum

From: chief engineer <cepmtkstp@gmail.com>
Sent: 18 April 2020 12:51
To: info@satragroup.in; gagan.virmani@lonrix.com; Tony Mathew <tmathew@trl.co.uk>; balakrishnay@satragroup.in
Subject: Supply, Installation, Testing and Commissioning of a Web based Software for RMMS for KPWD - extension of bid validity - reg.

This Message originated outside your organisation.

[Quoted text hidden]

Emails and their contents may be monitored for the purposes of quality control, fact checking and training.
This email, together with any attachments, is confidential and may be privileged. If you have received it in error, please notify the sender and delete it.
Please click here to view the TRL Privacy Notice.
TRL Limited, registered in England, No. 3142272, registered office: Crowthorne House, Nine Mile Ride, Wokingham, RG40 3GA, UK. VAT Registration 664 625 321

---

chief engineer <cepmtkstp@gmail.com> Mon, Apr 20, 2020 at 3:20 PM
To: Parvathy Subhadra <subhadraparvathy@gmail.com>

---------- Forwarded message ---------
From: **chief engineer** <cepmtkstp@gmail.com>
Date: Sat, Apr 18, 2020 at 12:50 PM
Subject: Supply, Installation, Testing and Commissioning of a Web based Software for RMMS for KPWD - extension of bid validity - reg.
[Quoted text hidden]
[Quoted text hidden]

Balakrishna Yarlagadda <balakrishnay@satragroup.in> Mon, Apr 20, 2020 at 12:24 PM
To: chief engineer <cepmtkstp@gmail.com>
Cc: info <info@satragroup.in>

20 January 2020

The Project Director

Kerala State Transport Project (KSTP)

TC11/339, Sreebala Buildings

Keston Road Kawdiar P.O

Thiruvananthapuram - 695 003, Kerala

Tele: +91-471-2318946, 2318985

Email: pdkstp@gmail.com; cepmtkstp@gmail.com

Sub: Procurement of "Supply, installation, testing and Commissioning of a Web Based Software system for road maintenance management for the Kerala public works department" under Kerala State Transport Project, (IFB No: KSTP-II – RMMS -01) – Extension of Bid Validity

Ref: Your email dated: 18-04-2020

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

000564

Project Director
K.S.T.P., PWD
Trivandrum

Dear Sir,

With reference to your below email, we SATRA Infrastructure Management Services Pvt Ltd. confirm to extend the bid validity of our proposal for furfure 45 days i.e. up to 05 June 2020, for the subject project.

Thanking you and assuring you of our highest consideration.

Enclosed as above

Thanks & Regards,

Bala krishna Yarlagadda

From: chief engineer [mailto:cepmtkstp@gmail.com]
Sent: 18 April 2020 12:51
To: info; gagan.virmani@lonrix.com; tmathew; Balakrishna Yarlagadda
Subject: Supply, Installation, Testing and Commissioning of a Web based Software for RMMS for KPWD - extension of bid validity - reg.

Sir,

[Quoted text hidden]

Satra I Man Pvt Ltd, Begumpet, India

01035071 _ Extension of Bid Validity.pdf
340K

Gagan Virmani <gagan.virmani@lonrix.com> Mon, Apr 20, 2020 at 5:30 PM
To: chief engineer <cepmtkstp@gmail.com>
Cc: Ravi Kiran <ravi@lonrix.com>, DS CHARI <dschari72@gmail.com>

The Chief Engineer (Projects)

Dear Madam/ Sir

We are happy to extend our bid for 45 days till 5th June 2020 as requested below.

Best Regards

Gagan Virmani

Vice President

Lonrix Ltd

Address: Ground Floor, 1/ 48 Tawn Place, Pukete, 3200, New Zealand

Telephone: +64 (0)7 849 2856

Mobile: +64(0)21 0238 4283

Email: gagan.virmani@lonrix.com

TRL SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

Website: www.lonrix.com

LONRIX

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TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

experion technologies

TRL

Table 3.5.4

Summary Sheet: Current Contract Commitments / Work in Progress

Name of Bidder or partner of a Joint Venture: **Experion Technologies (India) Private Limited**

Name of contract	Purchaser, contact address/tel / fax	Value of outstanding Information System (current US$ equivalent)	Estimated completion date	Average monthly invoicing over last six months (US$/ month)	Description
US Region					
Jonas Holding LLC DBA MiGym	111 N CANAL STE 500, Chicago IL, 60606	2,376	31-Mar-20	2,772	The project involved the development of a white-labeled mobile platform built specifically for the fitness industry, that provides gym members with the information they need about the club, on the go.
FormAssembly Inc	885 S College Mall Rd, #399 Bloomington IN, 47401	194	24-Feb-20	3,617	The project involved creating a data collection platform that will be used by organizations in healthcare, financial services, higher education, and multiple other industries to quickly create forms, collect data and streamline their workflows through smart integrations with Salesforce and other third-party systems.
Agape Funding LLC	3254 University Drive, Suite 180, Auburn Hills MI, 48326	3,396	30-Apr-20	3,751	The project involved developing an innovative food app that connects customers with food catering companies. The application aims to link users to preferred catering companies based on their requirements.

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

000567

Project Director
K.S.T.P., PWD
Trivandrum

Name of contract	Purchaser, contact address/tel ./ fax	Value of outstanding Information System (current US$ equivalent)	Estimated completion date	Average monthly invoicing over last six months (US$/ month)	Description
Delta 1 LLC	54 West 40th Street, New York,	5,104	31-Mar-20	4,767	The project involved in the development of an online equity finance marketplace for institutional investors. The desktop-based web application handles high volume transactions and integrates with Bloomberg APIs for fetching real time stock data.
D&L Technical Solutions Inc.	2200, South Dixie Highway, Suite 700 Miami, FL 33133	930	31-Mar-20	6,334	The project involved providing enhancements and maintenance support for the client flagship solution used by thousands of staff on board ships to manage the day to day operations of hotel marine maintenance and guest service departments.
Scanco Software LLC	1000 N Tamiami Trail #201, Nokomis FL, 34275	2,84,800	03-Aug-21	44,800	The project involves re-engineering their legacy solution into a SaaS-based production management ERP platform.
QuVa Pharma Inc	1075, W. Park, One Drive, Suite 100, Sugarland, TX 77498,	15,997	31-Mar-20	9,373	The project involved the redevelopment of client's existing order management application from ASPX to Angular JS and .NET technologies.
Quarem	919 Milam Street, Ste 1950, Houston, TX, 77002	40,262	30-June-2020 (Auto renewal at end of every year)	11,270	The project involved providing enhancement and maintenance for a US based

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

000568

Project Director
K.S.T.P., PWD
Trivandrum

Name of contract	Purchaser, contact address/tel./ fax	Value of outstanding Information System (current US$ equivalent)	Estimated completion date	Average monthly invoicing over last six months (US$/ month)	Description
Precision Landscaping & Construction Inc	14923 Jacob Ave, Hastings, MN 55033,	7,261	15-Apr-20	12,102	The project involved building a business process management solution for a US based landscaping and construction company
Helios Quantitative Research LLC	8757 Auburn Folsom Road, Number 2371, Granite Bay, CA 95746,	59,624	30-Jun-20	13,761	The project involved developing a custom financial analytical tool for financial advisors that enable financial advisors to compare-and-contrast end customers' financial portfolio with a variety of pre-built benchmark portfolios or model portfolios.
Albert and Mackenzie	28216 Dorothy Drive, Suite 200 Agoura Hills CA 91301	5,18,296	06-Mar-21	19,491	Experion to re-engineer a US based law firm's desktop-based case management application.
Salesboost LLC	5851 Legacy Circle, Suite 600, Plano, TX 75024	18,375	31-Dec-20	38,002	The project involved providing enhancements, maintenance, application testing (automation & performance testing) and infrastructure support for a training provider in the hospitality industry
Protocall Services Inc.	621, SW Alder St, Suite 400, Portland, QR	60,054	31-Dec-20	38,310	The project involved re-engineering of the client's existing incident management application with enhanced features using .Net technologies.
MapHabit	2528, Manor Walk,	38,836	31-Mar-20	41,366	Experion will help the client build a tablet-based application, which

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

000569

Project Director
K.S.T.P., PWD
Trivandrum

Name of contract	Purchaser, contact address/tel./ fax	Value of outstanding Information System (current US$ equivalent)	Estimated completion date	Average monthly invoicing over last six months (US$/ month)	Description
	Decatur, GA				uses these techniques to aid patients and their families work together in managing and reducing memory impairment challenges. The client is a healthcare solutions provider specialized in the neurodegenerative disease space.
Paradigm Sample LLC	115A Bayview Avenue Port Washington, NY 11050 USA	2,93,247	31-Dec-20	51,259	The client is a US-based Market Research organization. Experion has a multi-year partnership with the client in developing, maintaining and supporting its IT systems.
CRC R&D LLC	32 East Airline Hwy, Kenner, LA 70062,	98,702	31-May-20	73,959	Experion has partnered with the client to develop a cloud-based platform solution capable of integrating shipment tracking and direct driver messaging with real-time data on warehouse congestion and docking status.
Brush Country Claims	508, Cedar Drive, Georgetown, TX-78628,	5,25,658	06-Jan-2021 (Auto renewal at the end of every 3 months)	1,04,873	Experion will enhance & maintain & the core financial process management system of a Texas based financial process management company
Code Objects Inc.	1381, McCarthy Blvd, Milpitas, CA 95035	12,01,823	31-Dec-20	1,33,536	Experion provides ongoing development, maintenance and testing

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

000570

Project Director
K.S.T.P., PWD
Trivandrum

Name of contract	Purchaser, contact address/tel / fax	Value of outstanding Information System (current US$ equivalent)	Estimated completion date	Average monthly invoicing over last six months (US$/ month)	Description
					support for a US based insurance company
Australia and Oceana Region					
Infoactiv Australia	Level 2, 990 Whitehorse Road, Box Hill, Victoria 3128, Australia	13,581	30-Apr-20	4,427	The project involved developing a Demand Forecasting System through which demand forecast of the spare parts can be generated
RapidMap	University Hill, Business Park South, Suite 22, 2 Enterprise Drive, Bundoora, Victoria 3083	27,572	15-Apr-20	5,261	The project involved re-engineering the client's legacy Windows tablet-based GIS mapping and GPS examination application with an Android-based mobile and tablet application.
HealthTRx Global Ltd	PO Box 28530, Remuera, Auckland 1541	31,959	21-May-20	5,752	Experion has a strategic partnership with ISV focusing on the healthcare sector in Australia and New Zealand
Kingsley's Pty Limited	25, Cameron Street Farrer, Australian Capital Territory, Australia	35,657	30-Jun-20	6,291	The project involved the development of a cross platform solution to manage the delivery operations of restaurant chains. The solution handles the entire process right from order receipt, through delivery, to payment collection.
WorldSmart	50, Greenhill Rd, Wayville, SA	83,793	06-Jun-20	71,262	Experion partnered with an Australia based ISV to re-engineer their legacy

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

000571

Project Director
K.S.T.P., PWD
Trivandrum

Name of contract	Purchaser, contact address/tel./ fax	Value of outstanding Information System (current US$ equivalent)	Estimated completion date	Average monthly invoicing over last six months (US$/ month)	Description
					point-of-sale devices used in retail outlets
MegaScience Pvt Ltd	384, Moo 4, Soi 6, Bangpoo Industrial Estate, Praeksa, Samutprakarn 10280	1,72,144	30-Jun-20	4,416	The project involved the development of a mHealth platform that brings doctors, patients, and other stakeholders together.
Canada Region					
Health Soft	Wah Yuen Building, 149 Queen's Road Central, Canada	12,440	28-Feb-20	13,517	The project involved developing a web-based reporting and workflow engine which helps Radiologists produce high-quality, comprehensive diagnostic medical reports in the most efficient manner possible.
Europe Region					
European Society of cardiology	Les Templiers, 2035 Route des Colles, CS 80179 BIOT 06903 SOPHIA ANTIPOLIS	24,065	31-Mar-20	6,016	The project involved the development of a mHealth application that enables preventive cardiology by detecting lifestyle ailments/ conditions early
ETM Communications	Box 11096, 161 11 Bromma, Sweden	5,421	31-Dec-19	2,575	The project involves developing a location-based service that enables book nearest and cost-effective spaces (hotel lobbies, restaurants, etc.) for meetings and conferences.

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

Name of contract	Purchaser, contact address/tel./ fax	Value of outstanding Information System (current US$ equivalent)	Estimated completion date	Average monthly invoicing over last six months (US$/ month)	Description
TRL	TRL Limited, Crowthorne House, Nine Mile Road, Wokingham, Berkshire RG40 3GA, United Kingdom	1,92,263	31-Dec-21	55,235	Experion has a strategic partnership with the client, an internationally recognized Transport Research & Consulting firm that provides world-leading research, technology and software solutions for surface transport modes and related markets engaged in intelligent, new mobility innovations.
Experion Sàrl	43 Boulevard Georges-Favon, 1204 GENEVA	52,640	30-Apr-21	20,567	The project involved the development and testing of a web-based banking interface engine to automate supplier payment processing. The middleware solution developed, enabled the client to invoice their customers and pay their service providers and facilitate effective foreign exchange management using efficient reconciliation.
Middle East Region					
GTSC	Mussaffah, Abu Dhabi, UAE	1,420	31-Mar-20	1,906	The project involved developing and maintaining a web-based solution, that automates the entire business processes of a training center from student registration to the end of the course.
ESS	P.O. Box 121497,	1,25,120	31-Dec-20	15,640	The project involved in proving a mobile based enterprise solution for

000573

Project Director
K.S.T.P., PWD
Trivandrum

Name of contract	Purchaser, contact address/tel./ fax	Value of outstanding Information System (current US$ equivalent)	Estimated completion date	Average monthly invoicing over last six months (US$/ month)	Description
	Sharjah, UAE				field sales & distribution management
Darisini	Al-Rai Building, Airport Road, Shuwaikh Industrial, Kuwait	93,836	30-Apr-20	43,127	The project involved in the development of a platform that enables the students to access the interactive study material that is based on the school curriculum.

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

000574

Table 3.5.4

Summary Sheet: Current Contract Commitments / Work in Progress

Name of Bidder or partner of a Joint Venture: **TRL**

Name of contract	Purchaser, contact address/tel./ fax	Value of outstanding Information System (current US$ equivalent)	Estimated completion date	Average monthly invoicing over last six months (US$/ month)	Description
iROADS Sheffield PFI	Amey LG Limited, 20 Colmore Circus, Queensway, Birmingham, UK	660,717	31-Jul-38	6,322	Development of iRoads PFI (Private Finance Initiative) module for Amey-Sheffield to help them manage Streets Ahead Highways Maintenance and Management service across Sheffield.
iMAAP - Mauritius	State Informatics Limited (SIL), 6th Floor, Sun Insurance Building, Saint Georges Street, Port Louis, Mauritius	70,454	30-Jun-22	3,617	Supply, Implementation, and Deployment of a National Road Crash Data Management System (RCDMS) in Mauritius.
iMAAP Botswana	Dept of Road, Transport & Safety, Private Bag 0054, Gaborone, Botswana	131,485	31-May-22	16,314	Upgrade, Supply, Implementation, and Deployment of a National Road Crash Data Management System (RCDMS) in Botswana.
iMAAP Dubai 5 Year IT Support	Roads & Transport Authority, Dubai, Strategic Planning Department,	14,537	31-May-21	1,194	Support & Maintenance of iMAAP for Dubai Roads & Transport Authority

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director K.S.T.P., PWD Trivandrum

Name of contract	Purchaser, contact address/tel./ fax	Value of outstanding Information System (current US$ equivalent)	Estimated completio n date	Average monthly invoicing over last six months (US$/ month)	Description
	P.O Box 118899, UAE				
TFGM - Opening Local Authority Data	Transport for Greater Manchester, 2nd Floor, 2 Piccadilly Place, M1 3BG, Manchester, UK	21,874	31-Mar-20	1,476	Project to demonstrate the openness of the TRL SCOOT data by implementation of the TRL SCOOT UTC on a selected part of the Transport of Greater Manchester network.
1-922 HE Pavement Manageme nt System (HAPMS) Strategic and Engineerin g Advice	Highways England Company Ltd, FS Payments Team, The Cube, 199 Wharfside Street, B1 1RN, Birmingham, UK	80,110	30-Jun-20	8,687	Project to provide continuous advice to the client to upgrade the Pavement Management System
1-906 Forensic Examinatio n of Critical Special Geotechnic al Measures (Phase 1)	Highways England Company Ltd, FS Payments Team, The Cube, 199 Wharfside Street, B1 1RN, Birmingham, UK	25,056	30-June-20	12,130	
Forth Road Bridge Acoustic Monitoring - System Upgrade	Pure Technologies Ltd, 3rd Floor, 705 - 11th Avenue S.W, Calgary, AB T2R 0E3, Canada	8,969	30-Aug-20	10,140	System upgrade for acoustic monitoring of Forth Road Bridge

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

experion technologies

TRL

Name of contract	Purchaser, contact address/tel./ fax	Value of outstanding Information System (current US$ equivalent)	Estimated completion date	Average monthly invoicing over last six months (US$/ month)	Description
ReCAP Modular Bridges in Nepal	Cardno Emerging Markets (UK) Ltd, Level 5 Clarendon Business Centre, 42 Upper Berkeley Street, W1H 5PW, Marylebone, London , UK	205,819	15-Jun-20	6,005	System design for management of Modular Bridges in Nepal
ReCAP GEN2136A IMPARTS Phase 2/3	Cardno Emerging Markets (UK) Ltd, Level 5 Clarendon Business Centre, 42 Upper Berkeley Street, W1H 5PW, Marylebone, London , UK	123,563	Aug-21	10,798	To advise on the establishment of a new modular bridge system for Nepal.

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

000577

experion technologies

TRL

Table 3.5.8

Litigation History

Name of Bidder or partner of a Joint Venture: **TRL**

Declaration:

TRL doesn't have any history of litigation or arbitration resulting from contracts executed in the last five years or currently under execution.

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

000578

Table 3.5.8

Litigation History

Name of Bidder or partner of a Joint Venture: **Experion Technologies (India) Pvt Ltd**

Declaration:

Experion Technologies (India) Pvt Ltd doesn't have any history of litigation or arbitration resulting from contracts executed in the last five years or currently under execution.

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

900870

Draft email to TRL

Sub: Supply and Installation of RMMS Software – Clarification to bidding documents

Ref: Your bid dated 23.12.2019

Sir,

The bid submitted by you for **Supply, Installation, Testing and Commissioning of a Web-based Software System for Road Maintenance Management for the Kerala Public Works Department** does not clarify on the following requirements:

1. As per the BDS Clause ITB 6.1(a), the bidder is supposed to furnish experience certificates with relevant certificates from the concerned authorities
2. Bidders and each partner to an Joint Venture bid should provide information on their current commitments on all contracts that have been awarded, or for which a letter of intent or acceptance has been received, or for contracts approaching completion, but for which an unqualified, full completion certificate has yet to be issued.
3. Bidders, including each of the partners of a Joint Venture, shall provide information on any history of litigation or arbitration resulting from contracts executed in the last five years or currently under execution. A separate sheet should be used for each partner of a Joint Venture

Hence you are requested to submit the above mentioned details in the prescribed format as in the RFP within a week to complete the evaluation process

With regards

Chief Engineer (Projects)

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

000580

Kerala Public Works Department
Kerala State Transport Project (KSTP)
Project Management Team
T.C.11/339, SREE BALA Building
Keston Road, Nanthancode
Kowdiar.P.O, Thiruvananthapuram -695003.

Tel (Direct): 00-91-471-2318946
Telefax: 00-91-471-2318985
00-91-471-2318985
e-mail: cepmtkstp@gmail.com
www.keralapwd.gov.in

No. KSTP/1754/2019-AE6 20.01.2019

To

The Manager,
ICICI Bank India Limited
1st Floor, 163, H.T. Parekh Marg
Backbay Reclamation
Churchgate, Mumbai-400020
Maharashtra, India

Sir,

Sub: Supply, Installation, Testing and Commissioning of a Web Based Software System for Road Maintenance Management for the Kerala Public Works Department - Bank Guarantee confirmation – reg.

Ref: Bank Guarantee No. 0393BGFD006220 dated 18.12.2019 for an amount of Rs 7,50,000/- submitted by the bidder M/s TRL Professional & Software Services in JV with M/s Experion Technologies

It is brought to your kind information that in response to the tender floated by KSTP for the above work, M/s TRL Professional & Software Services, E-277, Greater Kailash-1, New Delhi, 110048 India LLP in JV with M/s Experion Technologies Private Limited has participated in the tender. Along with the bid, the firm has enclosed the Bank Guarantee as bid security issued from your bank.

In order to proceed with the tender, I request you to please confirm the Bank Guarantee No. 0393BGFD006220 dated 18.12.2019 for an amount of Rs 7,50,000/- issued to M/s TRL Professional & Software Services in JV with M/s Experion Technologies having validity up to 13.06.2020.

Please treat this matter as most urgent to help us complete the evaluation process. A copy of the BG is also enclosed for ready reference.

Yours faithfully

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP
Encl:- Copy of BG

Project Director
K.S.T.P., PWD
Trivandrum

Chief Engineer (Projects)

000581

Gmail chief engineer <cepmtkstp@gmail.com>

Supply, Installation,Testing and Commissioning of a Web based software System for Road Maintenance Management for the Kerala Public Works Department - BG Confirmation-reg.

5 messages

chief engineer <cepmtkstp@gmail.com> Tue, Jan 21, 2020 at 11:05 AM
To: dhruba.das@icicibank.com, chiranjibi.das@icicibank.com

Sir,
Please find the attachment

With regards
Chief Engineer (Projects)

2 attachments

maharashtra.PDF
50K

icicibg.PDF
360K

chief engineer <cepmtkstp@gmail.com> Tue, Jan 21, 2020 at 12:01 PM
To: backbaybg@icicibank.com

[Quoted text hidden]

2 attachments

maharashtra.PDF
50K

icicibg.PDF
360K

Dhruba Das /TxB/IBANK/MUMBAI <dhruba.das@icicibank.com> Tue, Jan 21, 2020 at 11:59 AM
To: BACKBAYBG <backbaybg@icicibank.com>
Cc: "cepmtkstp@gmail.com" <cepmtkstp@gmail.com>

Dear Team,

Please confirm the authenticity & validity of the Bank Guarantee here by attached

Best Regards,

Dhruba Das

From: chief engineer <cepmtkstp@gmail.com>
Sent: Tuesday, January 21, 2020 11:06 AM
To: Dhruba Das /TxB/IBANK/MUMBAI <dhruba.das@icicibank.com>; Chiranjibi Das /TxB/IBANK/MUMBAI <chiranjibi.das@icicibank.com>
Subject: Supply, Installation,Testing and Commissioning of a Web based software System for Road Maintenance Management for the Kerala Public Works Department - BG Confirmation-reg

External Email Warning: Do not click on any attachment or links/URL in this email unless sender is reliable

[Quoted text hidden]

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2 attachments

maharashtra.PDF
50K

icicibg.PDF
360K

postmaster@icici.com <postmaster@icici.com> Tue, Jan 21, 2020 at 12:01 PM
To: cepmtkstp@gmail.com

Delivery has failed to these recipients or groups:

backbaybg@icicibank.com

The recipient won't be able to receive this message because it's too large.

The maximum message size that's allowed is 500 KB. This message is 568 KB

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LTD

000582

Project Director
K.S.T.P., PWD
Trivandrum

Diagnostic information for administrators:

Generating server: HYDEXCH04.icicibankltd.com

backbaybg@icicibank.com
Remote Server returned '550 5 2 3 RESOLVER.RST.RecipSizeLimit; message too large for this recipient'

Original message headers:

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 15.0.1473.3; Tue, 21 Jan 2020 12:01:42 +0530
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 HYDEXEDG01.icicibankltd.com (192.168.119.241) with Microsoft SMTP Server id
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Received: from mail-wm1-f47.google.com (mail-wm1-f47.google.com [209.85.128.47])
        (using TLS with cipher ECDHE-RSA-AES128-GCM-SHA256 (128/128 bits))
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11:59:18 +0530 (IST)
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In-Reply-To: <CACmtddhfqBDJmNY2=AcLDCxNLrcP8ihUZ-dVJY75uCHqQvYggw@mail.gmail.com>
From: chief engineer <cepmtkstp@gmail.com>
Date: Tue, 21 Jan 2020 12:01:33 +0530
Message-ID: <CACmtddhf7J_0jQtLUsiK8CDboOjYPWEpRCCKPc_neCRML3-CqA@mail.gmail.com>
Subject: Fwd: Supply, Installation,Testing and Commissioning of a Web based
 software System for Road Maintenance Management for the Kerala Public Works
 Department - BG Confirmation-reg.
To: <backbaybg@icicibank.com>
Content-Type: multipart/mixed; boundary="0000000000007e676f059ca0f666b"
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TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

HYDEXEDG01.icicibankltd.com: ... 000583

Project Director
K.S.T.P., PWD
Trivandrum

during lookup of cepmtkslp@gmail.com: DNS timeout)

[Quoted text hidden]

Original-Recipient: rfc822;backbaybg@icicibank.com
Final-Recipient: rfc822;backbaybg@icicibank.com
Action: failed
Status: 5.2.3
Diagnostic-Code: smtp;550 5.2.3 RESOLVER.RST.RecipSizeLimit; message too large for this recipient

---------- Forwarded message ---------
From: chief engineer <cepmtkslp@gmail.com>
To: backbaybg@icicibank.com
Cc:
Bcc:
Date: Tue, 21 Jan 2020 12:01:33 +0530
Subject: Fwd: Supply, Installation,Testing and Commissioning of a Web based software System for Road Maintenance Management for the Kerala Public Works Department - BG Confirmation-reg

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---------- Forwarded message ----------
From: **chief engineer** <cepmtkslp@gmail.com>
Date: Tue, Jan 21, 2020 at 11:05 AM
Subject: Supply, Installation,Testing and Commissioning of a Web based software System for Road Maintenance Management for the Kerala Public Works Department - BG Confirmation-reg
To: <dhruba.das@icicibank.com>, <chiranjibi.das@icicibank.com>

Sir,
Please find the attachment

With regards
Chief Engineer (Projects)

"Print this mail only if absolutely necessary. Save Paper. Save Trees."

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2 attachments

maharashtra.PDF
50K

icicibg.PDF
360K

Sejal Chawda <sejal.chawda@icicibank.com> Thu, Jan 23, 2020 at 3:33 PM
Reply-To: sejal.chawda@icicibank.com
To: cepmtkslp@gmail.com
Cc: "Dhruba Das /TxB /IBANK/MUMBAI" <dhruba.das@icicibank.com>, Chiranjibi Das /CMB/IBANK/MUMBAI <chiranjibi.das@icicibank.com>

Dear Sir ,

Kindly find the attachment

On 1/21/2020 3:01 PM, Chiranjibi Das /TxB/IBANK/MUMBAI wrote

> Pls share the confirmation letter
>
> **From:** chief engineer <cepmtkslp@gmail.com>
> **Sent:** Tuesday, January 21, 2020 11:06 AM
> **To:** Dhruba Das /TxB /IBANK/MUMBAI <dhruba.das@icicibank.com>; Chiranjibi Das /TxB/IBANK/MUMBAI <chiranjibi.das@icicibank.com>
> **Subject:** Supply, Installation,Testing and Commissioning of a Web based software System for Road Maintenance Management for the Kerala Public Works Department - BG Confirmation-reg
>
> **External Email Warning:** Do not click on any attachment or links/URL in this email unless sender is reliable
>
> Sir,
>
> [Quoted text hidden]

Thanks & Regards ,
Sejal Chawda
ICICI Bank Limited
Commercial Banking Group
ICICI Centre, 163, H. T. Parekh Marg
Backbay Reclamation, Churchgate, Mumbai- 400 020
Landline no. 22667790, Mob no. 7400223133

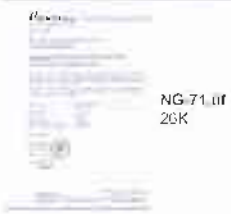
"Print this mail only if absolutely necessary. Save Paper. Save Trees."

Project Director
K.S.T.P., PWD
Trivandrum

000584

SERVICES (INDIA) LLP

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NG-71.tif
26K

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

000585

Gmail **chief engineer <cepmtkstp@gmail.com>**

Supply, Installation, Testing and Commissioning of a Web based Software for RMMS for KPWD- finalization of bid evaluation - reg.

2 messages

chief engineer <cepmtkstp@gmail.com> Sat, Jan 4, 2020 at 6:24 PM
To: balakrishnay@satragroup.in, info@satragroup.in, tmathew <tmathew@trl.co.uk>, gagan.virmani@lonrix.com

Sir,
Please find the attachment
With regards
Chief Engineer (Projects)

CE - Bidders.PDF
65K

Gagan Virmani <gagan.virmani@lonrix.com> Thu, Jan 9, 2020 at 4:45 AM
To: chief engineer <cepmtkstp@gmail.com>
Cc: Ravi Kiran <ravi@lonrix.com>

Dear Ms D'Cruz

Thank you for inviting us for making this presentation on the 21st.

We confirm our attendance.

If you could please let us know the venue so that we can plan accordingly.

Also, if you could please arrange for a stable wifi connection for the period of the presentation as this will be required.

Regards

Gagan Virmani

Vice President

Lonrix Ltd

Address: Ground Floor, 1/ 48 Tawn Place, Pukete, 3200, New Zealand

Telephone: +64 (0)7 849 2856

Mobile: +64(0)21 0238 4283

Email: gagan.virmani@lonrix.com

Website: www.lonrix.com

LONRIX

[Quoted text hidden]

SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

000586

File No KSTP/1754/2019-AE6

Kerala Public Works Department
Kerala State Transport Project (KSTP)
Project Management Team
T.C. 11/339, Sree Bala Building
Keston Road, Nanthancode, Kowdiar.P.O
Thiruvananthapuram – 695003

Tel (Direct): 00-91-471-2318946
Telefax: 00-91-471-2318958
00-91-471-2318985
e-mail: pdkstp@gmail.com
cepmtkstp@gmail.com
www.keralapwd.gov.in

KSTP/1754/2019-AE-6 — 04.01.2020

To

1) M/s SATRA Infrastructure Management Services Pvt. Ltd
#1-8-359 to 363, 5th Floor, Centre Point Building
SP Road, Begumpet, Secunderabad, Telangana-500003
2) M/s Lonrix Limited
10-1-8/2, 5th Floor
Vinayar Plaza, Asilmetta
Sampath Vinayak temple Road
Visakhapatnam-530003
3) M/s TRL Professional & Software Sevices (India) LLP
E-227m Greater Kailash-1
New Delhi, 110048

Sub: Supply, Installation, Testing and Commissioning of a Web based Software for Road Maintenance Management System for the Kerala Public Works Department- finalization of bid evaluation - reg.

Ref: Bid opening dated 23.12.2019

To finalize the evaluation process of the above bid, you are requested to do a technical presentation on the bid submitted by you and the proposed software before the Evaluation Committee on the date & time as mentioned below:-

Date: 21.01.2020
10.30 AM to 12.30 PM - Presentation by M/s SATRA
01.30 PM to 03.30 PM - Presentation by M/s TRL
03.30 PM to 05.30 PM - Presentation by M/s Lonrix

Yours Faithfully
DARLENE CARMELITA D'CRUZ
CHIEF ENGINEER

Approved for Issue

Assistant Executive Engineer

Project Director
K.S.T.P., PWD
Trivandrum

000587

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

ICICI Bank

Ref No:-ICICI/0393/MIS/2019-20/5835

January 23 -2020

To,
PROJECT DIRECTOR KERALA STATE TRANSPORT PROJECT
SREEBALA BUILDINGS KESTON ROAD
THIRUVANANTHAPURAM 695003

Sub: Confirmation of issuance of bank guarantee bearing no:0393BGFD006220 Dated:18-12-2019

Your letter ref:KSTP/1754 2019-AE6 DATED 20-01-2020

As requested by you, we confirm that the Bank Guarantee favouring yourself, has been issued by us on behalf of TRL PROFESSIONAL AND SOFTWARE SERVICES (INDIA) LLP and the officials who have signed the said Bank Guarantee are authorized to sign such documents on behalf of ICICI Bank Limited.

Please ensure original "Beneficiary copy" of Bank Guarantee is in your possession.We are further able to confirm only the below mentioned specific details of the Bank Guarantee from the records available with us presently.

Bank Guarantee No	0393BGFD006220
Date of Issue	18-12-2019
Expiry Date	13-06-2020
Claim Expiry Date	13-06-2020
Bank Guarantee Amount (INR)	7,50,000.00

Yours faithfully,

For ICICI Bank Limited

Authorized Signatory

MANGESH SAWANT
S4355
Manager-I

Project Director
K.S.T.P., PWD
Trivandrum

SERVICES (INDIA) LLP

000588

ICICI Bank Limited
1st Floor, 163, H.T. Parekh Marg,
Backbay Reclamation,
Churchgate, Mumbai - 400 020,
Maharashtra, India.

Website www.icicibank.com
CIN :L65190GJ1994PLC021012

Regd. Office : ICICI Bank Tower, Near Chakli Circle, Old Padra Road, Vadodara 390 007, India.
Corp. Office : ICICI Bank Towers, Bandra-Kurla Complex, Mumbai 400051, India.

Sr.No. 845584

BANK GUARANTEE
ICICI Bank Limited
(Incorporated in India)

BG Number: 0393BGFD006220
Issuance Date: December 18, 2019

ICICI Bank

BID SECURITY BANK GUARANTEE

We, ICICI Bank Limited, having one of its branch office at ICICI Bank Limited, ICICI Centre, 163 H.T. Parekh Marg, Backbay Reclamation, Churchgate, Mumbai 400020, India , and having its registered office at ICICI Bank Tower, Near Chakli Circle, Old Padra Road, Vadodara, Gujarat, Pin - 390007 (hereinafter referred to as "The Bank/Guarantor")

Beneficiary: Project Director, Kérala State Transport Project (KSTP), Sreebala Buildings, Keston Road, Thiruvananthapuram - 695003

Date: 18.12.2019

BID GUARANTEE No.: 0393BGFD006220

We have been informed that TRL Professional & Software Services, E-277, Greater Kailash-1, new delhi, 110048 (India) LLP in J V with Experion Technologies (India) Private Limited (hereinafter called 'the Bidder") has submitted to you its bid dated 15 December 2019 (hereinafter called "the Bid") for the execution of SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF A WEB BASED SOFTWARE SYSTEM FOR ROAD MAINTENANCE MANAGEMENT FOR THE KERALA PUBLIC WORKS DEPARTMENT under Invitation for Bids No. KSTP-II - RMMS - 01

Furthermore, we understand that, according to your conditions, bids must be supported by a bid guarantee, and that the bid guarantee automatically covers any alternative bids included in the Bid, if the Bidder is permitted to offer alternatives and does so.

At the request of the Bidder, We, ICICI Bank Limited, having one of its branch office at ICICI Bank Limited, ICICI Centre, 163 H.T. Parekh Marg, Backbay Reclamation, Churchgate, Mumbai 400020, India., and having its registered office at ICICI Bank Tower, Near Chakli Circle, Old Padra Road, Vadodara, Gujarat, Pin - 390007 (hereinafter referred to as "The Bank/Guarantor") hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of Rs. 7,50,000/-(Rupees Seven Lakh Fifty Thousand Only) upon receipt by us of your first written demand in writing accompanied by a written statement stating that the Bidder is in breach of its obligation(s) under the bid conditions, because the Bidder:

(a) has withdrawn the Bid (or any parts of it) during the period of bid validity specified by the Bidder in the Bid Submission Form or any extension of the period of bid validity which the Bidder subsequently agreed to; or

(b) having been notified of the acceptance of the Bid by you during the period of bid validity, (i) failed or refused to execute the Contract Agreement, or (ii) failed or refused to furnish the performance security, if required, in accordance with the Instructions to Bidders.

This guarantee will expire: (a) if the Bidder is the successful bidder, upon our receipt of copies of the contract signed by the Bidder and the performance security issued to you upon the instruction of the Bidder; or (b) if the Bidder is not the successful bidder, upon the earlier of (i) our receipt of a copy of your notification to the Bidder of the name of the successful bidder; or (ii) twenty-eight

ICICI BANK LIMITED
ICICI CENTRE
163 H. T. Parekh Marg,
Backbay Reclamation
Mumbai-400 020.

Page 1 of 2

For ICICI Bank Ltd.
Dinesh Gadhave
G-4808

Authorised Signatory

The beneficiary may, in its own interest, verify the genuineness of the bank guarantee by seeking confirmation of its issuance from a branch of ICICI Bank other than the issuing branch.

000590

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

FOR UNION BANK OF INDIA

AUTHORISED SIGNATORY

INDIA STAMP DUTY MAHARASHTRA

DEC 17 2019

12:45

R.0000100/-PB5862

This Forms an integral Part of

Bank Guarantee

issued by ICICI Bank Limited

0393BG..FD006220.....

ISSUE DATE: .....18-12-2019.....

For ICICI BANK LIMITED

Authorised Signatory

ICICI BANK LIMITED
ICICI CENTRE
H. T. Parekh Marg,
Backbay Reclamation,
Churchgate, Mumbai-400020.

Dinesh Gadhave
G-4808

Suhas S. Wagaskar
W-168

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

000589

Sl.No. 845585

BANK GUARANTEE
ICICI Bank Limited

Issuance Date: December 18, 2019

37 In case of extension/declaration of the BG's validity,

38 Consequently, any demand for payment under this guarantee must be received by us at the office
39 on or before that date i.e 13.06.2020.

40 This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 758

41 _____

42 [Signature(s)]

For ICICI BANK LIMITED

Authorised Signatory

Dinesh Gadhave
G-4808

Vidya S. Waghulkar
W-168

ICICI Bank LIMITED
ICICI CENTRE
H.T. Parekh Marg
Backbay Reclamation,
Mumbai-400020

BENEFICIARY COPY

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

The beneficiary may, in its own interest, verify the genuineness of the bank guarantee by seeking confirmation of its issuance from a branch of ICICI Bank other than the issuing branch.

Regd. Office: ICICI Bank Ltd., ICICI Bank Tower, Near Chakli Circle, Old Padra Road, Vadodara, Pin code- 390 007, Gujarat
Phone : +91-265-6722286, CIN L65190GJ1994PLC021012

000591

ICICI Bank

Ref: 0393BGFD006220

Date: 18-12-2019

To,
PROJECT DIRECTOR ,
KERALA STATE TRANSPORT PROJECT (KSTP) ,
SREEBALA BUILDING , KESTON ROAD ,
THIRUVANANTHANPURAM -695003

Sub: Issuance of Bank Guarantee

Dear Sir/Madam,

Please find the attached Bank Guarantee issued by us favoring yourself on behalf of :
TRL PROFESSIONAL & SOFTWARE SERVICES ,
E-277, GREATER KAILASH -1
NEW DELHI -110048

Please find the details mentioned below.

Bank Guarantee No. & Date of Issue	Expiry Date	Claim Expiry Date	Amount of Bank Guarantee
0393BGRFD006220 dated 18-12-2019	13-06-2020	13-06-2020	INR 750000 .00

We confirm that the officials who have signed the above Bank Guarantee are authorized to sign such documents on behalf of ICICI Bank Limited. You may verify genuineness of the Bank Guarantee from any branch of ICICI Bank in your own interest.

In the event of invocation, we request you to please ensure compliance with the terms and conditions of the bank guarantee in order to ensure timely payment. You are requested to ensure special care inter alia with respect to the following in the invocation claim letter-

- Bank Guarantee Number
- Expiry/Claim Expiry date
- Claim amount
- Designated Bank Branch for submission of invocation claim
- Any declaration/certification that may be required as part of the guarantee text
- Any other requisite document including the original Bank Guarantee

Thanking you,
Yours faithfully,
For ICICI Bank Limited

Authorized Signatory

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

000592

Gmail chief engineer <cepmtkstp@gmail.com>

KSTP II- Supply, Installation, Testing and Commissioning of a Web based Software System for Road Maintenance Management for the Kerala PWD – Notice of award

Tony Mathew <tmathew@trl.co.uk> Mon, May 11, 2020 at 8:47 AM
To: chief engineer <cepmtkstp@gmail.com>
Cc: Binu Jacob <binu.jacob@experionglobal.com>, Subu Kamal <skamal@trl.co.uk>

Dear Ma'am,

Many thanks for the award letter, we look forward to sign the contract and commence the project as per the schedule.

However, we have noted that figure (Rs. 4,37,04,162/-) quoted in your attached letter is different from our quoted fee which is Rs. 4,54,71,352/- We trust this would be a typing error.

We will make arrangements for the rest of the documents a suggested in your letter to sign the contract before 5 June 2020.

Assuring you the best of our services,

Kind Regards

Tony Mathew
Principal Transport Specialist

DD: +44 (0)1344 770750 | M: +91 9711806692 | E: tmathew@trl.co.uk
TRL | Crowthorne House | Nine Mile Ride | Wokingham | Berkshire | RG40 3GA | United Kingdom

TRL THE FUTURE OF TRANSPORT

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

From: chief engineer <cepmtkstp@gmail.com>
Sent: 08 May 2020 17:45
To: Tony Mathew <tmathew@trl.co.uk>; Marketing Enquiries <enquiries@trl.co.uk>
Subject: KSTP II- Supply, Installation, Testing and Commissioning of a Web based Software System for Road Maintenance Management for the Kerala PWD – Notice of award

000593

This Message originated outside your organisation.

Sir,

[Quoted text hidden]

Emails and their contents may be monitored for the purposes of quality control, fact checking and training.
This email, together with any attachments, is confidential and may be privileged. If you have received it in error, please notify the sender and delete it.
Please click here to view the TRL Privacy Notice.
TRL Limited, registered in England, No. 3142272, registered office: Crowthorne House, Nine Mile Ride, Wokingham, RG40 3GA, UK. VAT Registration 664 625 321

Scan1.PDF
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TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

000594

Gmail

chief engineer <cepmtkstp@gmail.com>

KSTP II- Supply, Installation, Testing and Commissioning of a Web based Software System for Road Maintenance Management for the Kerala PWD – Notice of award

chief engineer <cepmtkstp@gmail.com> Fri, May 8, 2020 at 5:44 PM
To: tmathew <tmathew@trl.co.uk>, enquiries <enquiries@trl.co.uk>

Sir,
Please find the attachment

With regards
Chief Engineer (Projects)

Scan1.PDF
50K

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

Project Director
K.S.T.P., PWD
Trivandrum

000595

000595

Gmail

chief engineer <cepmtkstp@gmail.com>

KSTP II- Supply, Installation, Testing and Commissioning of a Web based Software System for Road Maintenance Management for the Kerala PWD – Notice of award

chief engineer <cepmtkstp@gmail.com> Wed, May 13, 2020 at 5:08 PM
To: Tony Mathew <tmathew@trl.co.uk>

Sir,

Please find attachment

with regards

Chief Engineer (Projects)
[Quoted text hidden]

Document (1).pdf
25K

Project Director
K.S.T.P., PWD
Trivandrum

TRL PROFESSIONAL & SOFTWARE SERVICES (INDIA) LLP

000596

Table 4 Bid Prices (as Read Out from Bid Form)

Bidder Identification			Read-out Bid Price(s)		Modifications or Comments[1]
Name (a)	City/State or Province (b)	Country (c)	Currency(ies/√) (d)	Amount(s) (e)	(f)
SATRA Infrastructure Management Services Pvt.Ltd	Secundrurabad, Telegana	India	INR	4,37,37,210	Corrected considered figure is INR 4,30,10,305. (GST quoted figure was included & read inadvertently, which is now excluded in evaluation.)
TRL Professional & Software Services (India) LLP in JV with Experion Technologies (India) Pvt Ltd	New Delhi & Thiruvananthapuram	India	INR	4,54,71,352	Nil
Lonrix Limited / Sri Infotech Joint Venture	Visakhapatnam and Hyderabad	India	INR	5,41,82,835.63	Nil

Table 19 Combined Evaluation – Evaluated Bid Score (B)

Insert Weight for the Price (X) as indicted in the BDS: 0.52
Insert Weight for the Technical Score (1-X) as indicated in the BDS:0.48

Bidder (a)	Evaluated Bid Price (C) (b)[1]	Technical Bid Score (T) (c)[2]	$\frac{C_{low}}{C} \times X$ (d)[3]	$\frac{T}{T_{high}} \times (1-X)$ (e)[4]	Evaluated Bid Score (B) (f)=(d)+(e)
SATRA Infrastructure Management Services Pvt.Ltd	4,03,88,350	79.95	0.52	0.42	0.94
TRL Professional & Software Services (India) LLP in JV with Experion Technologies (India) Pvt Ltd	4,37,04,162.26	91.87	0.48	0.48	0.96
Lonrix Limited / Sri Infotech Joint Venture	4,87,54,160.06	88.37	0.43	0.46	0.89
Award Recommendation[5]	Award to highest Evaluated Bid Score (B) Bidder's Name TRL Professional & Software Services (India) LLP in JV with Experian Technologies (India) Pvt Ltd				