

# Guide for the design, management and delivery of pilots and trials on the Highways Agency network





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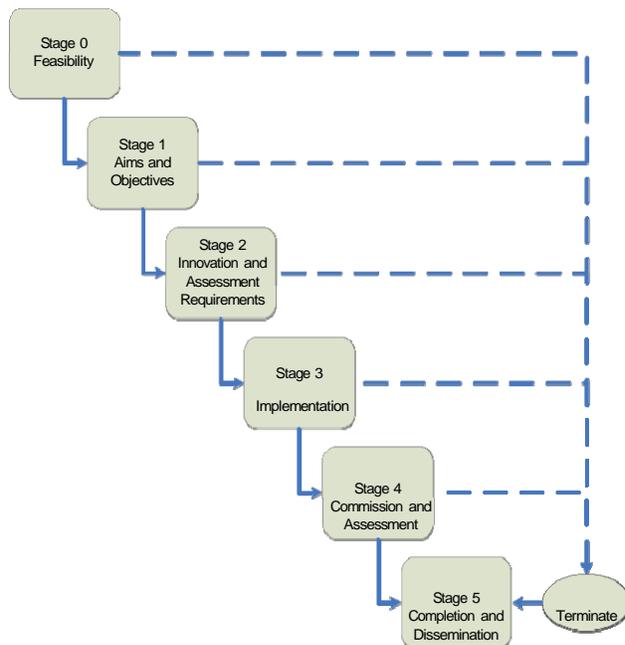
## Executive Summary

This process provides a guide for the design, management and delivery of pilots and trials on the Highways Agency (HA) network when an innovation, whether a service, system or item/product, is proposed for consideration.

This guide has been developed through consultation with a range of practitioners involved in the delivery of pilots and trials and also draws on international best practice and experience.

Through the early consultations with practitioners it was clear that there are a number of common issues that need to be addressed to ensure the successful delivery of a pilot or trial, whatever the size and scale of the pilot or trial being delivered.

The issues identified have been addressed through the development of the guide process. The guide is split into six different stages to reflect the activities and issues that need to be addressed through the life cycle of a pilot or trial. The guide process for the design, management, delivery and evaluation of pilots or trials is divided as follows:



**Stage 0 – Feasibility:** This stage is about establishing the potential benefits and impacts of undertaking a pilot or trial. This is addressed through consideration of a literature review, alternative option investigation, determination of possible impacts and effects on the current network, data collection issues, and outline cost benefit considerations. **Appropriate approvals must be sought before progressing to the next stage.**

**Stage 1 – Aims and Objectives:** It is essential that the precise aims and objectives of the pilot scheme are determined. Through this stage all the potential user needs for the pilot will be identified, including for example the needs of the travelling public, the network operators and potential decision makers. These will be used to determine clear aims and objectives and the overall scope

for the pilot.

**Stage 2 – Innovation and Assessment Requirements:** In this stage three parallel streams of work are conducted, a) to determine the functional and other requirements for the innovation, b) to determine the pilot or trials assessment methodology and the associated performance indicators and c) to define and select an appropriate location for the pilot. Whilst these three streams are carried out in the same stage, they are intrinsically linked and require continuous information exchange to ensure the effective delivery of the pilot.

**Stage 3 – Implementation:** Through this stage the pilot is procured, implemented and validated against the defined requirements. The collection of previously identified ‘before’ data would commence early through this stage.

**Stage 4 – Commission and Assessment:** Following the successful validation the pilot will be commissioned and formally accepted by the HA. Calibration would be carried out to ensure the performance of the innovation is optimised, leading to the assessment determining its overall impact and performance against the criteria defined within the requirements.

**Stage 5 - Completion and Dissemination:** The end point of a pilot or trial must be clearly defined to enable the effective hand over or decommissioning as appropriate. Through this stage the lessons learnt, good and bad, will be collated and disseminated to the pilots stakeholders and others as appropriate.

The subsequent progression from one stage to another is subject to the review of the continuing feasibility, attainability, viability, validity and impact of the pilot. A series of continuing activities need to be progressed through all stages of the pilot, these include:

A – Project and Programme Management

B - Stakeholder Management

C - Procurement and Maintenance Strategy

D - Risk Management.

Within the guide process there is advice on the level and type of activities needed at each stage of the pilot.

There is also guidance on the type of issues that should be considered in moving forward with a pilot or trial.

The guide has been developed to help practitioners involved in the delivery of both small and large pilots and trials. However, it is recognised the extent and depth of each end of stage review will be appropriate for the scale of the innovation under consideration.

Through the use of the guide, the Agency will improve the overall design, management and delivery of pilots and trials on its network.



# 1 Introduction

The aim of the Highways Agency (HA) is to provide 'Safe Roads, Reliable Journeys and Informed Travellers.' To deal with the ever increasing demands on the network, the HA are continually researching and developing new and emerging innovations, technologies and techniques.

This guide for the design, management and delivery of pilots and trials on the Agency's network has been prepared to provide an overall process to be adopted by practitioners for the consideration and potential implementation of such future ideas, concepts or innovations.

This process should be considered and adopted by all involved in pilot or trial schemes and is applicable to both scales of investigation.

The Agency's Network Performance Group (NPG) is responsible for the overall co-ordination of pilots and trials within the Agency. This co-ordination role allows NPG to make sure that any new initiatives being piloted or trialled are not duplicating effort which may be happening elsewhere on the network. An important requirement is that NPG must be informed of, and in some cases approve, all pilots and trials; this is done using the PT1 form found in Appendix A. This requirement is vital to ensure that the results of any innovations which can have a positive impact on the Agency are disseminated in the most appropriate way and also to allow any benefits to be realised as quickly as possible.

The guide has adopted three categories of pilots and trails, namely:

Category A (Trial) – Minor scheme or project with minimum impact on network operations and business targets, usually a trial or research trial e.g. new type of equipment cabinet paint.

Category B (Trial) – Medium schemes or projects which will not have any adverse impact on network operations and Agency business targets, but will require co-ordination with regional Network Delivery and Development Directorate and Traffic Management Directorate teams. This category would be a trial or could become a pilot if later designated by NPG e.g. new type of variable message sign.

Category C (Pilot) – Most significant schemes and projects with high political sensitivity, press interest, Regional Control Centre (RCC) resource requirements or impact on Agency targets, including safety and the 'On Time' reliability measure e.g. Active Traffic Management. All pilots must be approved by NPG.

For consistency 'pilot' is used throughout the rest of this document as a general term for both a pilot and a trial.

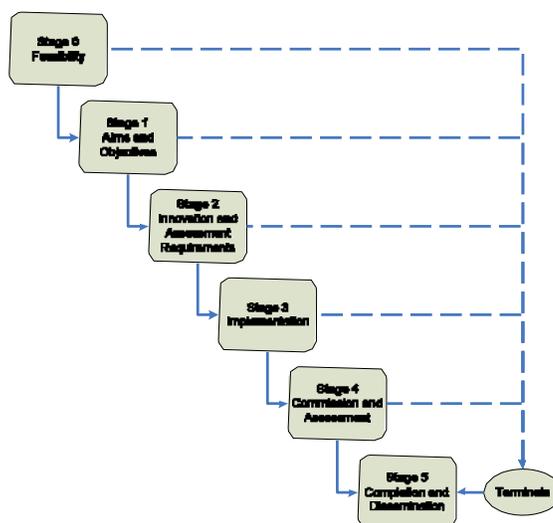
Throughout this document the guide is referred to as the GDMDPT, namely the HA 'Guide for the Design, Management and Delivery of Pilots and Trials.'

The GDMDPT has been developed through a series of consultations and a workshop **[HA 2006A]** with practitioners who have been involved in an extensive range of different pilots and trials.

International experience and best practice on pilots and trials has been identified through an extensive literature review. A related document, D002 GDMDPT Literature Review **[HA 2006B]**, summarises the current information available on the development, management and assessment of innovations in the transport sector, especially within Intelligent Transport Systems (ITS). The review document provides outlines of the source of all the literature referenced in this process document. The review includes the relevant standards or guides which should be considered in design, management and delivery of the pilot schemes.

Through an assessment of the issues that need to be addressed the GDMPT has been developed as a six-stage process as shown in Figure 1.1 namely:

- Stage 0 Feasibility
- Stage 1 Aims and Objectives
- Stage 2 Innovation and Assessment Requirements
- Stage 3 Implementation
- Stage 4 Commission and Assessment
- Stage 5 Completion and Dissemination.



**Figure 1.1 - GDMPT Stages**

This guide outlines an overall roadmap of areas for consideration throughout a pilot, identifying a number of clearly defined stages through its life cycle from the recognition of the initial concept or innovation, through the pilot's implementation plan, procurement and assessment to its completion.

The subsequent progression from one stage to another is subject to the review of the continuing feasibility, attainability, viability, validity and impact of the pilot. The guide summarises and provides guidance on the types of issues to be considered in moving forward with a pilot and the tasks that should be carried out at each of the identified stages.

In addition to each of the stages outlined, a number of concurrent and continuous strategic activities have been identified that will continue throughout the life cycle of the pilot, namely:

- A - Project and Programme Management
- B - Stakeholder Management
- C - Procurement and Maintenance Strategy
- D - Risk Management.

The interrelationship between these aspects of a pilot are shown in Figure 1.2.

The scale of a pilot will impact upon the extent to which some of the activities are considered. It is essential that due consideration is given to each of the detailed stage elements of the process and all of the strategic activities for the guide to be ultimately beneficial to the HA.

Throughout the various stages of the guide it is also necessary to review and consider, against its aims and objectives, the ongoing viability of a pilot and terminate if necessary.

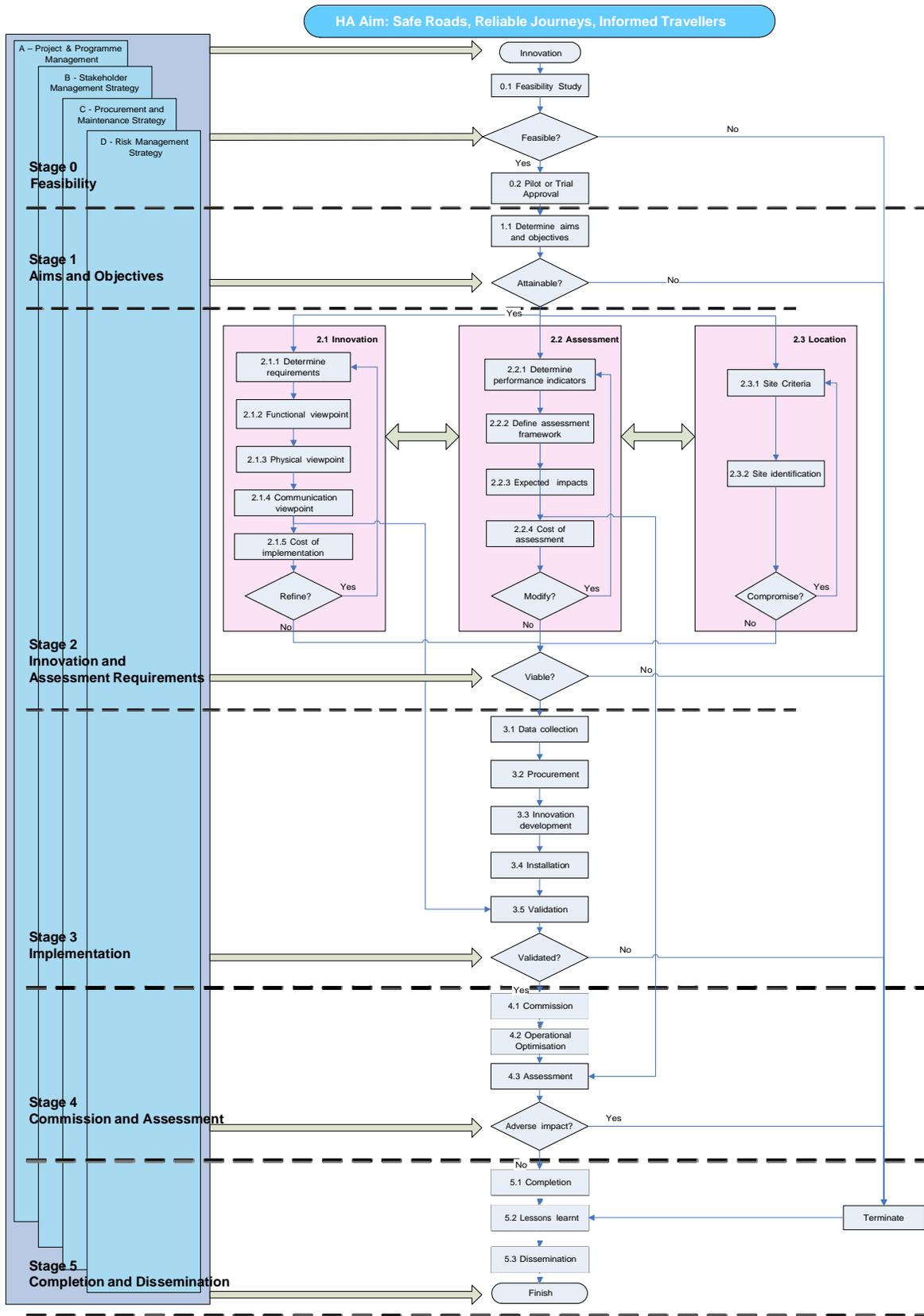
By the nature of innovation and experimentation not all pilots will prove to be 'successful'. Not all pilots will continue to a 'roll-out' conclusion and its continuation cannot be presumed. Lessons will always be learnt from a pilot whether taken to completion or terminated and it is essential that these lessons are shared by the practitioners. The dissemination of this information is a key element of any pilot or trial.

Annex A to this guide provides a copy of Form PT1 to be used to inform and where required provide approval before initiating a pilot or trial.

Annex B provides additional guidance on the strategic aspect of the guide.

Annex C provides checklists of information to be considered at each stage in the guide process.

Annex D lists the reference documentation to be consulted for additional guidance and information.



**Figure 1.2 - Process Diagram for the Design, Management and Delivery of Pilots and Trials on the HA Network**

## 2 Strategic Activities

This section provides a summary of strategic activities that should be actively programmed throughout the lifecycle of a pilot. Within the stages of the guide there is more detailed advice on the appropriate activities that should be addressed. Further information can be found in Annex B.

These ongoing strategic activities include:

- A – Project and Programme Management
- B - Stakeholder Management
- C - Procurement and Maintenance Strategy
- D - Risk Management.

### 2.1 A - Project and Programme Management

Project and programme management is the key to ensuring a successful pilot. PRINCE2 [OGC 1998] is a structured project management methodology which provides clear guidance on the effective design and implementation of projects. It provides a framework covering the wide variety of disciplines and activities required within a project. The focus throughout PRINCE2 is on the business case, which describes the rationale and business justification for the project. The methodology also helps to manage risk, control quality and change effectively.

It is possible that there will be changes both major and minor in the requirements specification before the innovation is developed and implemented. A stringent procedure for tracking and considering these changing requirements should be established. This will ensure that the impacts of modification in one area of an innovation can be considered within other areas and any necessary changes implemented. A guide to configuration management for intelligent transportation systems developed by the Federal Highway Administration (US DoT) (FHWA) [FHWA 2002B] can be referenced for a robust procedure to change management. Whatever the innovation it is essential to control and agree changes in requirements throughout the development process.

Pilot managers should conduct the following activities to ensure successfully delivering pilots:

- Plan: Decide what needs to be done, when and by whom in order to achieve the objective
- Act: Put the above decisions into action
- Review: Review all parts of the project and identify if they have had the desired result
- Improve: Improve those parts of the project that did not have the desired result or could improve the likelihood of success next time.

The HA have introduced the 'Investment Control Framework' [HA 2007A] to ensure effective corporate governance regarding investment appraisal, and the control of income and expenditure in the Highways Agency. In particular to ensure:

- Best value for money.
- Effective management control and decision making.
- Good financial and contractual propriety.

Practitioners should follow the Investment Control Framework as required for all Agency projects. This means that all projects must be formally approved by an Investment

Decision Maker and conducted in accordance with the Framework. The framework ensures that robust and visible financial and contractual delegations exist within the Agency. It also ensures compliance with the DfT Investment Appraisal Framework (IAF) and where appropriate, the guidance of the Office of Government Commerce (OGC) gateway review process.

The OGC Gateway [**OGC 2006A**] process examines a programme or project at critical stages in its lifecycle, to provide assurance that it can progress successfully to the next stage. This will be carried out at key decision points by a team of experienced people, independent of the project team. Within the Agency the Project Owner is responsible for deciding whether a project requires a formal OGC gateway review.

## **2.2 B - Stakeholder Management Strategy**

Stakeholder management is crucial. The purpose of the Stakeholder Management Strategy (SMS) is to ensure internal and external organisations associated with a pilot participate and support its successful delivery.

The specific goals and objectives of the SMS are to:

- Define the strategy for stakeholder management
- To ensure full buy-in by all stakeholders
- Define the status of stakeholders
- To ensure stakeholder support at all levels to permit other sub-groups to pursue their objectives without delay
- To agree scope of participation of stakeholders
- Define the stakeholder communications management strategy
- To ensure full co-ordination of strategy with other parties.

The SMS will focus on ensuring the co-operation of all the various stakeholders in achieving the overall aims of the pilot. It will address all the organisations responsible for the processes, the people, the policies and the environments that will be affected by the pilot and must also include the longer term operators of the innovation.

## **2.3 C - Procurement and Maintenance Strategy**

The procurement strategy for any pilot should be developed at an early stage. It is not just about minimising costs, within the pilot but about balancing fitness for purpose, the overall whole life cost and treating suppliers fairly.

The strategy should determine alternative priorities with the choice of procurement options dependant upon the nature and objectives of the pilot. For example, it may be that comparison between the interoperability of potential suppliers is an objective of the pilot, consequently the procurement procedures must reflect this need for flexibility.

As part of the procurement strategy the assessment framework for potential suppliers should be developed. This will identify the criteria and potential emphasis to be adopted when comparing potential pilot providers. By the nature of pilots the flexibility and known working practices of suppliers used previously may be advantageous but this aspect must be balanced against innovative methods of working provided by new suppliers.

Consideration as to how a pilot will be maintained, through and potentially following the completion of the pilot, must also be considered as part of the procurement strategy. Consideration should also be given to any necessary training required by those involved in the pilot, including any third party organisations.

## 2.4 D - Risk Management Strategy

Risk is anything that could hinder the achievement of business goals or the delivery of stakeholder expectations. Risk can arise from failure to exploit opportunities as well as from threats materialising. By the nature of experimentation, it is implicitly more risky than a normal development project as there will be considerably more unknown aspects to its implementation. The consideration of the potential risks and the management of them are consequently key to the successful delivery of a pilot.

Risk Management is the culture, processes and structure aimed at managing potential opportunities and threats to an organisation.

The Highways Agency Framework for Business Risk Management [**HA 2005B**] determines the strategic elements of the Risk Management framework.

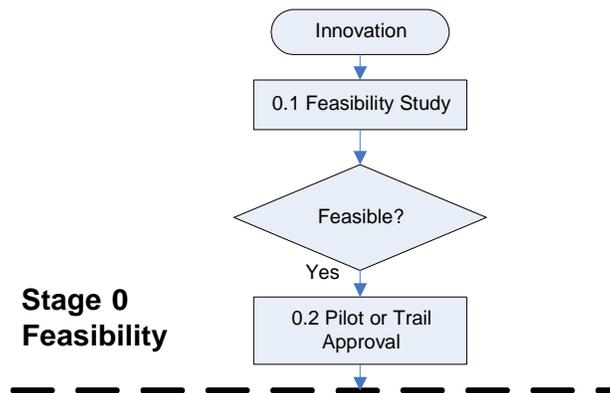
Practitioners should manage risk in accordance with the principles detailed in OGC's Management of Risk (M\_o\_R) [**OGC 2005**]. This provides a generic framework for the management of risk across all parts of an organisation and project - strategic, programme, project and operational. It incorporates all the activities required to identify and control the exposure to any type of risk, positive or negative, which may have an impact on the achievement objectives.

Health and Safety Risk Management should be carried out in accordance with the Agency's Health and Safety Management System (HSMS).

Practitioners should establish a risk register at the beginning of a pilot project, continually review and update it and mitigate the risks while the pilot is delivered. Suggestions as to items to include within a risk register can be found in the OGC Resource Toolkit [**OGC 2006C**]. The HA Ramp Metering project risk register also provides an example of the areas for consideration [**HA 2006H**].

### 3 Stage 0 Feasibility

#### 3.1 Stage 0 Activities



**Figure 3.1 - Steps within Stage 0**

##### **Step 0.1 - Feasibility Study**

Through this step the following activities, would be addressed: a literature review, alternative option investigation, determination of possible impacts and effects on the current network, data collection issues, and outline cost benefit considerations.

The initial stage in the development of any pilot, i.e. feasibility, is about establishing the potential benefits and impacts of undertaking a pilot. This feasibility assessment would draw upon the breadth of previous experience and skills both inside and outside the Agency.

The need for and size of the feasibility study should be related to the scale of the pilot and the value and impact of the innovations should it be rolled out. Experience within the HA has shown significant benefits of greater up-front investment during the early stages of a pilot and this is to be encouraged, for example: the feasibility study undertaken for Active Traffic Management [HA/TRL 2001].

A feasibility study would typically address the following issues:

- Problem and concerns
- Previous experience
- Alternatives
- An impact assessment
- Potential cost and benefits leading to business case
- Potential pilot sites
- Preliminary programme.

##### 3.1.2 Problem and concerns

When the Highways Agency is presented with a concept or innovation that could potentially be used to solve a network problem the first stage would normally be to undertake a feasibility study. This would investigate its application and appropriateness to the HA network and alignment with the HA vision, aims and objectives.

In taking forward a feasibility study it is critical that the objectives and outcomes from the feasibility study are clearly defined and agreed with interested parties.

### 3.1.3 Previous experience

One of the first steps should be collecting and reviewing previous experience. This should be from within the HA, other parts of government and also from the broader user community. This can help to ensure the previous lessons are learnt and adequate capability and resources in the HA are determined for the pilot.

Literature research would determine applications of an innovation elsewhere. The review would collate the experience and lessons learnt from previous implementations of the innovation globally and consider its potential impacts on the Highways Agency's network, the surrounding environment and the broader community. An example of a typical literature review for an HA pilot is the Literature Review of HOV Lane Schemes produced by TRL [TRL 2005A]

The review should be carried out using both internal HA and external sources. The HA Knowledge Compendium [HA 2006C] provides a summary of current and historic research undertaken in the Agency. If the innovation involves the use of technology, ITS Radar [HA 2005A] can be used to provide intelligence on historic ITS products and initiatives. This summarises key information for decision makers and practitioners alike, regarding innovative pilot projects worldwide and emerging ITS technologies. ITS innovations are scored according to pre-defined criteria including relevance to the HA. ITS Radar considers technologies deployed in other areas and looks at their applicability to the world of transport.

When undertaking this review it is important to recognise that results from overseas may not be directly applicable to the UK because of different driver behaviour and environment. Experience from previous schemes has also shown that the level of monitoring typically undertaken to establish impacts is less complete than those generally for a UK scheme. When using such information in feasibility studies it is worth trying to establish the level of monitoring and evaluation undertaken. Similarly, practitioners should be careful in using information in product sales literature unless information is supported by qualitative studies.

### 3.1.4 Alternatives

Through this stage consideration should also be given to other existing alternatives to solve the same problem or improve an existing situation. The advantages of the possible alternative innovations would be considered at this stage and outline comparison made to identify the unique selling points of the specific pilot.

### 3.1.5 An impact assessment

The anticipated impacts of the scheme need to be identified and quantified. This will include not only the positive aspects of an innovation but also any potential dis-benefits and costs. Where there is no previous experience related to the innovation, models may be used to provide an indication of likely benefits.

The Project Appraisal Report (PAR) [HA 2006J] and the associated DfT's WebTAG [DfT 2006A] provides a framework to be used during the feasibility stage. PAR is used to appraise all HA improvement projects which aren't being undertaken by Major Projects Directorate. It is the key summary document in which the need for the project, its costs and benefits (including those that cannot be quantified in money terms) are brought together to aid the decision maker in judging the worth and priority of the project. The document allows the benefits to be assessed against all of the Government's five objectives for transport (environment, safety, economy, accessibility and integration).

### 3.1.6 Potential cost and benefits

It is important to establish the likely costs for implementing a pilot and the potential wider roll-out of the innovation. Where possible, costs should be established from a variety of alternative sources.

The costs and benefits information is used to establish the overall business case for the pilot to demonstrate that in principle it meets the Agency's business needs, it is affordable and achievable and having considered a range of options it is likely to provide value for money. The OGC Resource Toolkit [OGC 2006B] provides guidance on the preparation and areas for inclusion within the business case.

For a pilot it is important to consider the likely monitoring requirements and their associated costs. In some cases the costs of assessment may be much higher than the cost of implementing an innovation, however this may be justified by the potential benefits should the pilot progress through to a broader roll out on the Agency's network. The Transport Analysis Guidance Website - WebTAG [DfT 2006A] provides guidance on the appraisal of transport projects and wider advice on scoping and carrying out transport studies.

### 3.1.7 Potential pilot sites

A particular issue for pilots is where it is likely to take place. This can range from enclosed private testing facilities to a major section of the Agency's network depending upon the scale of the pilot. As part of the feasibility study it is advantageous if the outline criteria for the selection of potential pilot sites for application of the innovation can be identified. When identifying the pilot location, experience from previous pilots has illustrated the importance of establishing what other activities are planned that could impact upon pilot delivery and monitoring over the longer term.

In identifying pilot sites it is worth considering the level of key stakeholder engagement since this can have a significant impact upon the success of a pilot. Additionally it is worth considering the physical location, e.g. Sites of Special Scientific Interest etc. and the potential need for an Environmental Impact Assessment.

#### **Step 0.2 – Pilot or Trial Approval**

This step requires that the PT1 form be completed and approved before progressing any further.

If at the completion of Stage 0 the review concludes the innovation is feasible, Form PT1 (Annex A) will be completed and authorised at the appropriate level as detailed below:

Category A Trials – Minor schemes or projects with minimum impact on HA network operations and business targets, usually a trial or research trial e.g. new type of equipment cabinet paint. Trials at this level should be submitted for information only to the Regional Operations Board (ROB). The trial will subsequently be submitted to NPG for information.

Category B Trials – Medium schemes or projects which will not have any adverse impact on network operations and Agency business targets, but will require co-ordination with the regional Network Delivery and Development Directorate and Traffic Management Directorate teams. This category will require approval by the ROB. The trial will subsequently be submitted to NPG for information but could become a pilot if designated so by NPG e.g. new type of variable message sign.

Category C Pilots – Most significant schemes and projects, with high political sensitivity, press interest, RCC resource requirements or impact on Agency targets, including safety and the 'On Time' reliability measure e.g. Active Traffic Management. All Category C pilots will require consideration by NPG on timing, location and status and will not proceed without NPG's approval. A Category C pilot will therefore, subject to NPG's decision, be rejected or approved to continue as a pilot or alternatively re-designated as a trial.

## 3.2 Strategic Actions

An outline programme for delivery should be produced. It is important that the programme covers all key activities and shows their inter-dependencies. In addition to the programme for delivery consideration should also be given to the size and skills of the team needed to deliver the pilot.

The stakeholder management strategy should be outlined. In particular internal stakeholders within the Agency and government should be kept engaged during the feasibility stage through regular updates and briefing. Whatever the outcomes of the feasibility study, there is a benefit in sharing the results.

It is unlikely that the procurement options will be finalised at this stage but available options should be identified for taking forward should a pilot be progressed.

The levels of risk associated with the delivery of pilots, because of the nature of innovation, can be higher than more traditional projects. It is therefore important that a framework for the management of risk across all aspects of the pilot is developed. This will assist in identifying and controlling the exposure to any type of risk, positive or negative, which may have an impact on the achievement of the objectives and also the overall probability of success.

The development of the risk register is a key element in this and must be produced at an early stage and with the associated contingency built into the budgetary estimates. The risk register should be populated with the key risks classified according to likelihood and impact. Mitigation measures as appropriate should also be identified.

The register should be updated and reviewed regularly throughout the feasibility stage and be in a form where it can be handed on should the pilot be progressed by another team.

Further information on the strategic activities can be found in Annex B.

### **3.3 Continuation**

At the completion of Stage 0 consideration must be given to the ongoing feasibility of piloting the innovation. This will be summarised within the preliminary business case confirming the overall strategic fit and its business need. The extent and depth of this review will be appropriate for the scale of the innovation under consideration. For larger pilots this may involve an OGC Gateway 1 – Business Justification Review. For smaller pilots this may not be appropriate but the review should demonstrate that options have been identified and appraised and also affordability, achievability and value for money established.

Checklist 0 – Feasibility in Annex C provides a summary of issues that should be considered, addressed and reviewed by the completion of this stage.

If an innovation is not considered feasible at the completion of Stage 0 the pilot should not be progressed. This could be for a number of reasons, for example the innovation may not be appropriate at this time or the potential impacts may be considered to be excessively detrimental. An exit strategy to provide a smooth completion of the pilot at this stage will need to be developed and implemented. Whatever the reasoning, lessons can be learnt from this feasibility stage and it is essential that these are collated and disseminated in accordance with the guidance provided in Stage 5.

If at the completion of Stage 0 the review concludes the innovation is feasible, Form PT1 (Annex A) will be completed and approved at the appropriate level, as detailed in step 0.2

Following authorisation the pilot will progress to Stage 1.

### **3.4 Stage 0 Outputs**

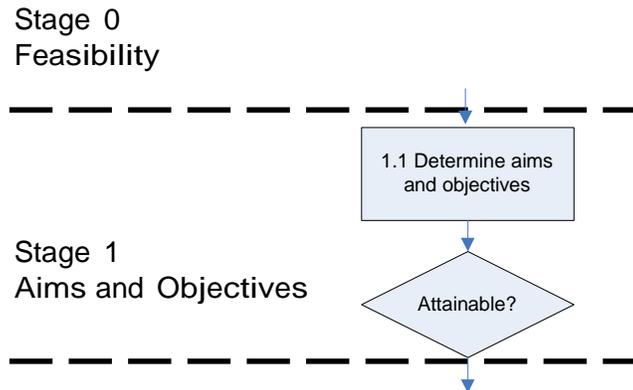
Typical outputs that might be expected from this stage include:

- (i) Feasibility report
- (ii) Business case
- (iii) Outline project programme
- (iv) Outline stakeholder management strategy
- (v) Outline risk management plan
- (vi) Completed Pilot and Trial initiation form PT1.

The size and scale of the pilot will determine the extent to which each of these outputs is developed. It is expected that all these aspects will have been considered and form part of the overall stage review prior to continuation to Stage 1 or alternatively the termination of the pilot at Stage 0.

## 4 Stage 1 Aims and Objectives

### 4.1 Stage 1 Activities



**Figure 4.1 - Steps within Stage 1**

#### **Step 1.1 - Determine Aims and Objectives**

Through this stage all the different users needs for the pilot will be identified. These will be used to determine clear aims and objectives and the overall scope for the pilot. The identification, initial communication, liaison and consultation with the various stakeholders associated with the innovation will be established. Options for the preferred procurement method and risk identification and mitigation would also be considered.

The aims and objectives Stage 1 of the pilot progresses following the successful review of the feasibility Stage 0.

Obtaining and recording a clear understanding of the requirements of all the various users for an innovation is the essential first step in the development of a pilot. It is important to appreciate that the term 'users' is used collectively to encompass all those potentially impacted by the pilot, including those directly using or influenced by the innovation and other decision makers and stakeholders.

In this context users could include network managers, system or service managers, drivers, passengers, commercial drivers, fleet operators, police and emergency services, HA traffic officers, freight operators, etc. Decision makers could include a range of local and national government departments or agencies, system providers, etc. It is also necessary to take account of other stakeholders needs including for example, local residents who may not use the HA network but may be affected by a pilot.

Through the identification of these user needs the pilot's aims and objectives and its scope can be clearly defined, i.e. what is and equally importantly what is not, included within the scope of the pilot. From the consultation process and workshop [HA 2006A] a major concern with delivering pilots has been the expansion of its scope with consequent impact upon timescales, costs and outputs. Whilst there may be understandable reasons for the modification of a pilot's initial scope and objectives, any changes, particularly those from the initial feasibility stage, must be fully justified and their implications reviewed and confirmed.

It is against the aims and objectives that the success of a pilot will be ultimately determined and assessed. The development and agreement of these, particularly for a larger pilot, is likely to include representatives from each of the HA directorates.

The process of collecting and applying user information through, for example, interviews, group discussions etc., will:

- Identify the capacities, limitations, needs, expectations and requirements of users which are important to consider when designing the pilot,
- Identify the criteria based on the user capacities, limitations, needs and requirements against which the pilot will be judged.

An essential element of the user needs analysis is due consideration of the overall strategy and aim of the HA in developing services to deliver safe roads, reliable journeys and more informed travellers.

The European Commission: 'Guidebook for User Needs Analysis' [EC 1998A], through the use of a framework and checklist, ensures that the essential elements of a user needs analysis are covered. The guidebook is particularly useful for HA practitioners involved in the delivery of pilots as it provides definitions, principles, guidelines and methods for user needs analysis and these are supplemented by case studies. This guidebook will support user needs analysis activities from the outset of a pilot and ensure consistency across the range of HA pilots.

In an ideal situation any pilot design would start with the user and their needs however it is more likely to start from either:

- A definition of problems users might be experiencing which might benefit from a new innovation
- An innovation which has already been defined for which user needs must be identified
- An adaptation to an existing innovation for which user needs have already been identified.

When developing a pilot's objectives these should always be defined to be SMART; that is to say:

- Specific
  - o State a defined outcome/result
  - o Be precise
- Measurable
  - o Quantifiable
  - o Define the criteria for success
- Achievable
  - o Within an innovations capabilities but challenging
  - o Not too difficult, not too easy
  - o Compatible with other objectives
  - o Within available resources (time and/or money)
  - o Appropriate resource should be in place
- Relevant
  - o Directly linked to the objectives and priorities of the Highways Agency
  - o Appropriate to current and future developments
- Time-framed
  - o Set a date for completion

- o Identified as medium or long-term
- o Part of a series of phased dates for long-term.

In determining objectives for an HA pilot, it is useful to have appropriate cross directorate input and to include specialists who can provide advice on the likely measurability of a specific outcome. Workshops have proved an effective way in the past in establishing HA pilot objectives. The Highways Agency 'Review of Objectives for the M1 HOV Pilot' [HA 2006E] provides a good example of a pilot for which clear objectives have been established at an early stage.

## 4.2 Strategic Actions

Through Stage 1 a fuller understanding will be apparent as to the timescales and milestones for the pilot. These need to be reflected within the overall pilot programme.

Stakeholder identification and liaison are key elements of this stage and the specific requirements should be outlined here.

Options for procurement of the innovation to be piloted should be considered though this stage.

The development of the risk management plan and associated risk register is a key element in this Stage 1. This must be produced at an early stage with the associated contingency built into the budgetary estimates.

Further information on the strategic activities can be found in Annex B.

## 4.3 Continuation

At the completion of Stage 1 consideration must be given to the ongoing attainability of piloting the innovation. This will be summarised within the outline business case confirming the preferred way forward. The extent and depth of this review will be appropriate for the scale of the innovation under consideration. The review should demonstrate that the overall aims and scope of the pilot have been clearly defined and that these are attainable within the agreed financial and other limits identified within the feasibility study.

Checklist 1 – Aims and Objectives in Annex C provides a summary of issues that should be considered, addressed and reviewed by the completion of this stage.

If an innovation is not considered attainable at the completion of Stage 1 the pilot should not be progressed. This could be for a number of reasons, for example the innovation may not be appropriate at this time or the potential impacts may be considered to be excessively detrimental. An exit strategy to provide a smooth completion of the pilot at this stage will need to be developed and implemented. Whatever the reasoning, lessons can be learnt from this aims and objectives stage and it is essential that these are collated and disseminated in accordance with the guidance provided in Stage 5.

If at the completion of Stage 1 the review concludes the innovation is attainable, it will progress to Stage 2.

#### **4.4 Stage 1 Outputs**

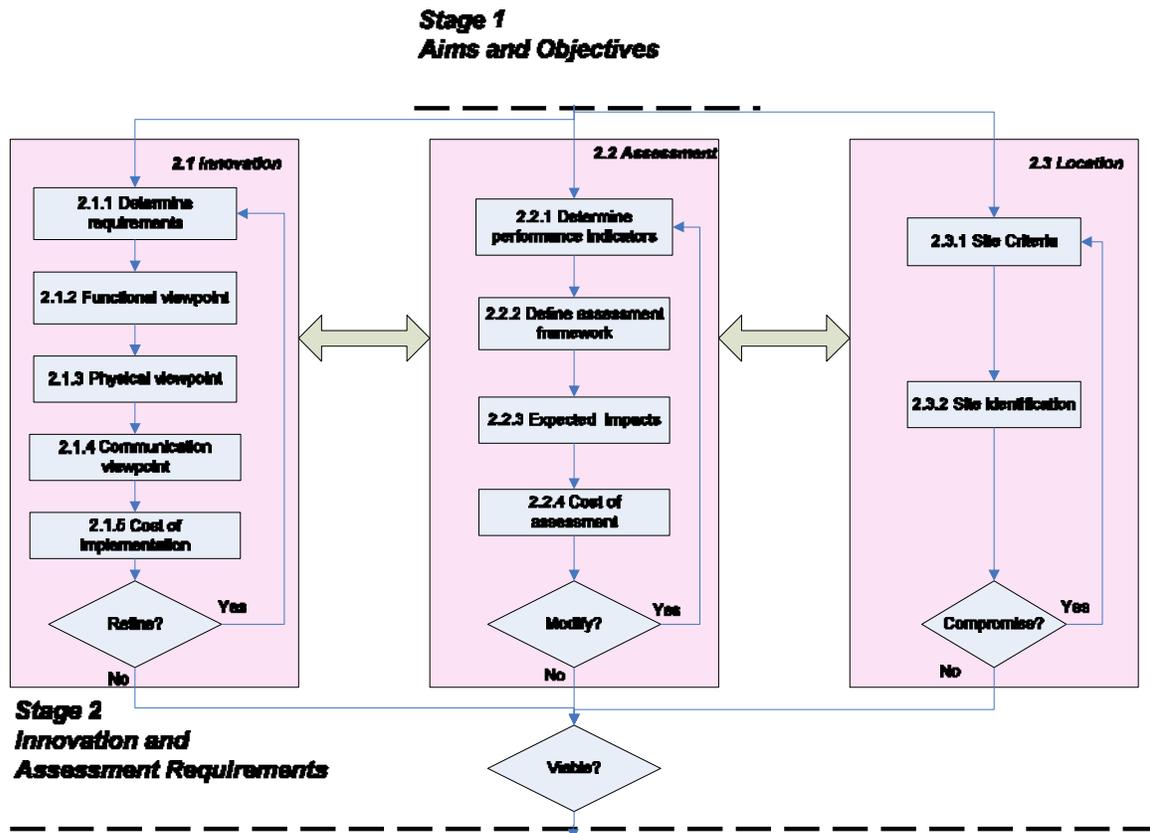
Typical outputs that might be expected from this stage include:

- (i) Pilot Scope and boundaries
- (ii) User needs analysis
- (iii) Aims and objectives
- (iv) Updated business case
- (v) Updated project programme
- (vi) Resource requirements
- (vii) Stakeholder management strategy
- (viii) Outline procurement strategy
- (ix) Refined risk management plan.

The size and scale of the pilot will determine the extent to which each of these outputs is developed. It is expected that all these aspects will have been considered and form part of the overall stage review prior to continuation to Stage 2 or alternatively the termination of the pilot at Stage 1.

## 5 Stage 2 Innovation and Assessment Requirements

### 5.1 Stage 2 Activities



**Figure 5.1 - Steps within Stage 2**

Through this stage three parallel streams of work need to be conducted. The first is to determine the functional and other requirements for the innovation. The second is to determine the assessment methodology and performance indicators for the pilot. The third stream is to define and select an appropriate location for the pilot. Whilst these three streams are carried out in the same stage, they are intrinsically linked and require continuous information exchange to ensure the effective delivery of the pilot.

### 5.2 Stream 2.1 – Innovation Requirements

#### **Stream 2.1 - Innovation**

This stream will collate the overall and detailed user needs for the innovation. These will be used to develop the pilot's functional requirements or viewpoint, its physical context and the associated communication requirements.

This stream will provide a clear and detailed indication about what the innovation will achieve through a series of concise, complete, attainable, unambiguous and verifiable statements. These statements will build upon the user needs analysis carried out during Stage 1 which clearly defined the user requirements for the innovation. It may be necessary to revisit the user needs determined though Stage 1 to confirm their continued applicability, should for example, delays have occurred between the completion of Stage 1 and the authorisation to commence Stage 2 or the innovation boundaries may have altered. When a clear set of innovation requirements have been developed, cost

estimates for its implementation can be prepared and reviewed. It will also assist in any subsequent configuration management required for pilots investigating ITS developments.

The requirements documents will provide the definition of what the stakeholders want the innovation to provide in terms of the services to be delivered and any constraints to be placed on the delivery of these services. This will also include ensuring that the innovation aligns with the overall HA strategy and vision.

By defining the innovation requirements in this manner it will make sure that all parties, including stakeholders and implementers, have the same understanding of the innovation. This will lead to a successful pilot and enable the concept of the innovation to be more readily implemented on the HA network.

#### **Step 2.1.1 - Determine Requirements**

This step will utilise the user needs, collated within Stage 1 – aims and objectives, to develop a series of statements defining the requirements for the innovation

In 2000 the European Commission published the European ITS Framework Architecture. It describes the general ITS architecture development process. It has been updated and become a base document for European ITS Framework Architecture Deliverable Documents [EC 2004]. FHWA produced a document on developing functional requirements for ITS projects [FHWA 2002A]. These are useful references for innovation requirement analysis in HA pilot projects, particularly for ITS projects.

An example of how this progression from functional requirements, through the physical to the communications requirements, can be found in the Highways Agency Ramp Metering System Requirements Specification [HA 2006F].

Within the overall boundaries and scope of the pilot as defined in Stage 1 there are likely to be three prime aspects to the description of the innovation requirements, namely:

- (i) the functional requirements or viewpoint – this defines and describes what functionality is needed to be included within the pilot in order to fulfil the requirements of the user needs
- (ii) the physical viewpoint – this defines and describes how the functional architecture will be brought together into groups to form physical entities
- (iii) the communication considerations – this defines and describes how the information is exchanged between different parts of the system.

These three aspects are applicable to all types of pilots, whether considering a complex technological innovation or the simple implementation of alternative practices. For all pilots it is essential to define what function or functions that are expected to be achieved by the innovation under consideration. This could range from simple statements such as: 'This road cone shall be visible to drivers, with minimum legal eyesight, in good weather conditions from a distance of 100m' to 'This system shall correctly read and identify number plates from vehicles travelling up to 200kph'. These will all define what the innovation is expected to do.

For simple innovations there may be only limited physical requirements. A simple road cone must be able to withstand inclement weather conditions and statements as to the minimum expected environmental standards would be stated as part of the requirements. For a number plate recognition system the physical requirement would be more complex physical requirements perhaps specifying what would be required to be achieved on the roadside and within a control room.

With regard to the communication requirements this area would not be a consideration for a road cone pilot. However, for the number plate recognition system definitions of what data would be expected to be transferred between, for example the roadside and the control room, would be required.

For technology based pilots and trials, the Traffic Technology Division (TTD) Code of Connection [**HA 2007B**] should be applied where necessary. This is to ensure that all connections to TTD devices, systems or services are not exposed to high levels of security risk. Applicants who wish to connect to TTD systems and services are required to follow the Code of Connection as defined within MCH1415."

Early involvement of the HA teams responsible for the future maintenance of the pilot will help to reduce ambiguities in the requirement, minimise the change of the requirement specification and provide a more resilient understanding of the time and cost for the design and implementation.

**Step 2.1.2 - Functional Viewpoint**

This step defines the functionality needed by the innovation to fulfil the requirements

The functional viewpoint will not only define how the user needs will be fulfilled but also how it will interface with entities and other innovations outside the pilot's boundaries and scope.

**Step 2.1.3 - Physical Viewpoint**

This step defines how the functionalities can be grouped into physical locations to form implementable innovation to fulfil the requirements

The physical viewpoint describes how the various aspects of the functional viewpoint can be grouped into physical locations to form a feasible innovation. This viewpoint will also consider any of the user needs that have physical (as opposed to functional) requirements.

**Step 2.1.4 - Communications Viewpoint**

This step, developed from the physical viewpoint, describes the communications links needed to provide implementable innovation and fulfil the requirements.

Developed from the physical viewpoint the communications viewpoint describes the kind of communications links needed in an innovation to support any necessary information flows. It will consider those requirements from the user needs, where they relate to specific communication requirements.

**Step 2.1.5 - Cost of implementation**

This step, developed from the functional, physical and communications viewpoint, estimates the likely cost of implementing the innovation within the trial. Consideration may also be given to the potential total costs of implementing the innovation across the wider HA network following a successful assessment.

When a clear set of innovation requirements have been developed, cost estimates for its implementation will be prepared and reviewed. As part of this estimation process the potential cost of a broader roll out programme of the innovation across the national HA network should be prepared. Consideration may be given, for example, to the potential savings that may accrue through the wider implementation or regional variations.

The development of the overall pilot requirements specification will generally follow a process from definition, through review and revision until there is agreement between the key stakeholders. Part of the review process will be the consideration of the estimated costs of the design specification. The determination of costs should be a continual consideration in the development of the pilot requirements and must include all aspects of the innovation including for example traffic management, temporary site works etc.

### 5.3 Stream 2.2 - Assessment Requirements

#### **Stream 2.2 - Assessment**

The purpose of this stream is to determine key performance indicators (KPIs) for the pilot and develop the overall test methodology to assess these indicators. This stream will also consider the various impacts of the innovation and the likely cost of the overall assessment process. The extent and the practicality of the range of data collection issues would also be addressed.

This stream will define the necessary assessment requirements and should be determined once the aims and objectives in Stage 1 have been finalised. It will be carried out in parallel to the innovation requirement analysis and site selection streams. Each of these streams is intrinsically linked and should not be considered in isolation from each other.

Pilots, by their nature, involve novel or innovative ideas and techniques about which there is uncertainty as to their effectiveness and the scope of their application. As a consequence, monitoring and assessment are very important to evaluate the performance and provide evidence to the decision makers to roll-out or terminate.

The identification and definition of the assessment objectives will be based upon the definition of the user needs in Stage 1. This will provide the key questions to which the end users, the decision makers and other stakeholders must have answers. Stakeholders and suppliers should be involved through this stream to review and refine the assessment requirements.

The HA Guidelines for the Monitoring and Evaluation of Pilot Projects [**Powell 2001**] provides useful guidance to enable the assessment framework development. This guide highlights three impacts of pilots which should be monitored and assessed:

- The immediate effects to enable rapid changes to be made to counteract any unforeseen, dangerous or other adverse outcomes
- Short term impacts to be identified early in the life of the scheme at reasonable cost
- Medium to longer term, wider, impacts.

#### **Step 2.2.1 - Determine performance indicators**

This step considers and determines the key performance indicators (KPIs) to be monitored by the pilot against which the impact of the innovation will be assessed.

In this stream, a range of performance indicators would be identified in order to assess the broad range of potential impacts of the innovation. This could include, for example, the concept's ability to reduce congestion or improve accessibility, safety, or the environment. A list of the Performance Indicators issued by the Audit Commission [**AC 2012**] may be helpful in determining these indicators.

The impacts of pilots may not always provide positive benefits and the pilot must be balanced and designed to ensure that all potential impacts are considered.

#### **Step 2.2.2 - Define assessment framework**

This step defines the methodology that will be used to measure and quantify the performance indicators defined in step 2.2.1.

Having determined the potential impacts and the range of indicators to assess them consideration must be given to how these impacts are to be quantified and measured. It is possible at this stage that the likely impact of some indicators will be minimal, particularly in comparison to the size of the pilot being undertaken. Judgement will be required to assess the risk of eliminating the quantification of some of these potential indicators.

Consideration should also be given here to the potential of combining the measurement of two or more indicators. It is essential at this stage that all the assumptions made in the

assessment are recorded. These will prove particularly useful should the completion of the pilot lead to the development and adoption of new standards.

A document to determine the methodology to be adopted to quantify the impacts must be produced. This is a particularly important document which must be updated if new indicators are identified or the overall methodology is subsequently modified.

The design of the methodology must enable a truly independent assessment of the innovation to be determined. To avoid bias, an independent party may be needed to carry out the assessment. It is possible that the requirements for the innovation itself may provide an opportunity, with only minimal changes, for collecting and presenting essential assessment data and information. Close liaison between the assessment stream and the innovation requirements stream is essential at this stage.

A guide and a comprehensive checklist issued by the European Commission in 1998 provides detailed guidance on this [EC 1998B]. It provides a detailed guide and checklist for assessment of transport telematics applications.

The Assessment Strategy developed for the Active Traffic Management Pilot [HA/TRL 2004] and the M1 HOV [TRL 2005B] provides a good example of the considerations that should be made in the development of a pilot's assessment framework.

An important aspect to consider is to ensure that sufficient representative 'before data' is collected. Whilst data collection cannot commence until the pilot has been reviewed and progressed to Stage 3 - Implementation, it is strongly recommended that preparation for before data collection is started at the earliest opportunity.

#### **Step 2.2.3 - Expected impacts**

This step considers and estimates the impact that is anticipated through the implementation of the innovation in the pilot.

Having developed the overall methodology the anticipated impacts of the system should be quantified. This will consider the impacts, positive and negative, of the pilot in isolation and also the impact of the implementation of the innovation across the broader HA network following a successful roll-out.

This estimation of the impacts will be used as part of the stage review process to ensure that the business case for the pilot will continue to be justified.

#### **Step 2.2.4 - Cost of assessment**

This step estimates the likely cost of the assessment of the innovation within the pilot.

The final step of this stream is to determine the estimated costs of the assessment methodology. These cost estimates would include for example, purchase and installation costs of the data collection equipment, resources associated with the data collection monitoring processes and any subsequent analysis costs.

Throughout this stream the overall assessment methodology would be continually reviewed and refined to ensure that it enables the cost effective assessment of the potential impacts and the performance of the innovation. If necessary, the assessment methodology would be modified, reviewed and refined.

## **5.4 Stream 2.3 - Location Requirements**

### **Stream 2.3 - Location**

The third stream in this stage is site selection. This includes developing the criteria for the consideration of the pilot site, traffic data analysis, health and safety assessment, environmental impact analysis and site identification.

In this stream, the test site will be identified and selected. This will include developing the necessary criteria for the selection of the pilot site, the traffic data analysis, health and safety assessment and the environmental impact analysis.

The site selection is critical. An inappropriate site could lead to an inconclusive or even a negative result. For example, the benefit from ramp metering will only be obtained on certain sites depending on the traffic situation and geometric constraints [HA 2006G].

Final site selection should be carried out following the completion of Stage 1 when the aims and objectives have been determined. It will be carried out in parallel to the innovation requirement analysis and assessment requirement streams. Each of these streams is intrinsically linked and should not be considered in isolation from each other.

#### **Step 2.3.1 - Site criteria**

This step develops the criteria required to be fulfilled by the pilot site

The criteria and definition of the site selection must be clearly defined and the pilot site would be selected accordingly. This would consider for example, traffic conditions, potential environmental impacts, local political issues, seasonal effects and financial factors.

The accessibility to and availability of the site for the pilot must be also assured, e.g. road space booking, traffic management arrangements and adjacent roadworks that could otherwise compromise the pilots results.

#### **Step 2.3.2 - Site identification**

This step applies the criteria defined in step 2.3.1 to locations on the HA network or off road sites to identify the location of the pilot.

Site visits and assessments should be made in order to investigate the suitability of alternative locations. If possible, all parties involved in the scheme should visit the test sites and provide comment.

Sites must also meet any requirements for Health and Safety. Environmental impact analysis may be required to analyse all factors affecting the environment. If needed, a plan should be developed to mitigate the impact. Risk assessment would be carried out to determine the extent of the risks at the sites and how to mitigate them.

A site selection report would be produced to summarise how the pilot site is selected and the possible associated risks. The ATM Site Selection Report can be used as an example [HA/TRL, 2001].

Further information on the strategic activities can be found in Annex B.

## **5.5 Strategic Actions**

A detailed programme for the pilot, including details for each stream in Stage 2, i.e. innovation requirements specification, assessment methodology and pilot location, must be produced.

It is essential that robust costs estimates are developed for the innovation under consideration. This may lead to refinement in the overall innovation requirements and its design.

During this stage particular control must be made regarding changes to the innovation requirements and objectives. Measures must be implemented to consistently review suggested changes both from a technical and business perspective.

Through this stage, the methodology and resources to collect and analyse the data will be planned. Consideration as to how this will be procured and maintained throughout the duration of the pilot must be considered. In particular this must include for any essential road space booking and traffic management that may be required for the installation of any data collection equipment.

It is crucial to continually engage with stakeholders through this stage. This can ensure that the aims and objectives are clear and that all parties and the key people agree with the pilot scope, understand the meaning of the requirements and agree with the requirement, which is crucial for a successful pilot.

Through this stage consideration should be given to procurement issues related to the pilot site. This may include for example the rental of secure temporary accommodation to locate assessment equipment or the provision of utility services.

Consideration as to the appropriate form of contract should also be undertaken at this stage.

The risk log should be reviewed and mitigated where practical including for example changes to cash flow or shortfalls in resources. Both the identified objectives and the potential risks must be communicated and understood by all stakeholders as appropriate.

Further information on the strategic activities can be found in Annex B.

## **5.6 Continuation**

After the completion of all three streams within Stage 2, consideration must be given to the overall viability and programming of the pilot. This will balance the estimated costs and impacts of the innovation itself, the assessment framework and the pilot location, identifying alternative procurement routes to ensure these provide flexibility for potential enhancements typically needed in pilots. This will be summarised within the full business case validating the assumptions made to support the continued investment within the pilot.

The extent and depth of this viability review will be appropriate to the scale of the innovation under consideration. The scale of the pilot may require that an OGC Gateway 2 - Procurement Strategy Review may be carried out at the end of this stage. If the review concludes the innovation is viable, it will progress to Stage 3.

Checklist 2 – Innovation and Assessment Requirements in Annex C provides a summary of issues that should be considered, addressed and reviewed by the completion of this stage.

If an innovation is not considered viable at the completion of Stage 2 the pilot should not be progressed. An exit strategy to provide a smooth completion of the pilot at this stage will need to be developed and implemented. Whatever the reasoning, lessons can be learnt from this requirements stage and it is essential that these are collated and disseminated in accordance with the guidance provided in Stage 5.

If at the completion of Stage 2 the review concludes the innovation is attainable, it will progress to Stage 3.

## **5.7 Stage 2 Outputs**

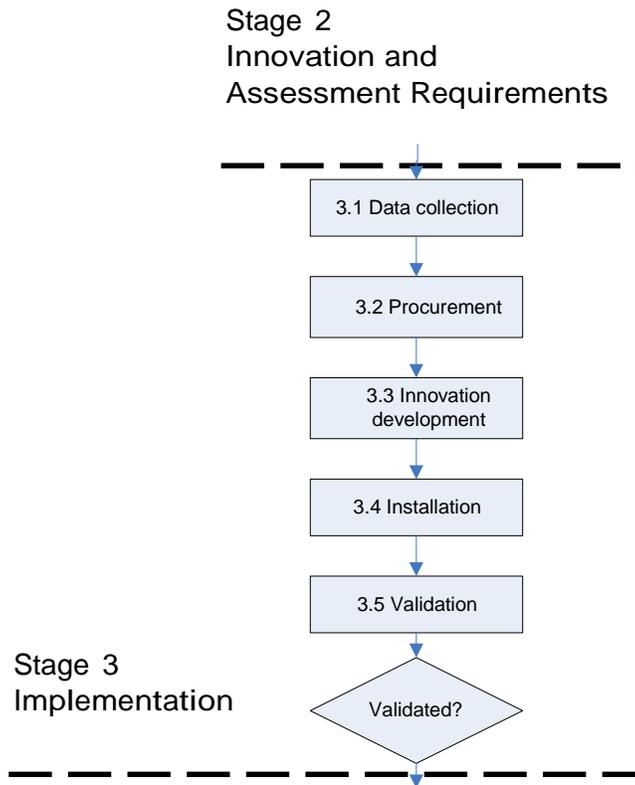
Typical outputs that might be expected from this stage include:

- (i) Requirements specification
- (ii) Assessment framework specification
- (iii) Pilot location criteria and pilot location
- (iv) Updated business case
- (v) Detailed project programme
- (vi) Detailed resource requirements
- (vii) Updated stakeholder management strategy
- (viii) Procurement and maintenance strategy
- (ix) Updated risk management plan and register.

The size and scale of the pilot will determine the extent to which each of these outputs is developed. It is expected that all these aspects will have been considered and form part of the overall stage review prior to continuation to Stage 3 or alternatively the termination of the pilot at Stage 2.

## 6 Stage 3 Implementation

### 6.1 Stage 3 Activities



**Figure 6.1 - Steps within Stage 3**

#### **Step 3.1 – Data Collection**

During this step data collection would commence to enable a 'before' scenario to be quantified and subsequently assessed.

As soon as is practically possible following the successful review of Stage 2 the collection of suitable before data should be initiated. It is essential that sufficient comparable data is available to reflect the 'before' pilot situation.

Whilst the nature of the data may not be directly comparable with the anticipated quality of 'after' data following the implementation of the pilots it is necessary to determine a base reference situation. As part of the base reference it may also be necessary to determine base information through a range of seasonal variations.

Consideration must be made as to the impact the construction of the pilot itself may have upon for example traffic and other conditions. Depending upon the timescales involved in the pilot's development avoidance of construction may not be practical and consideration may be given to the use of comparable information at other locations. If there is any change of the evaluation plan, the plan should be reviewed and agreed with all stakeholders, particularly the cost, resource, and impact.

The assessment requirements may anticipate the collection of data partly to be achieved through use of the innovation itself. It may be necessary to develop interim solutions to collect comparable before data. For example video analysis using temporary cameras could be introduced to determine flow characteristics prior to the introduction of loop detection systems associated with a pilot.

### **Step 3.2 - Procurement**

During this step the innovation and the associated assessment systems and services as specified through Stage 2 will be procured.

It is likely that this procurement step will be carried out in parallel with the data collection.

The procurement of the innovation defined by the requirements detailed in Stage 2 will be initiated in accordance with the overall strategy considered and developed through this previous stage.

If this involves departures from existing standards appropriate measures and approvals must be sought. The innovation supplier would need to be selected on the basis of the combination of the quality and price which for a given service or project will achieve the delivery of best value.

For a large pilot there are likely to be many different procurement strands and it is essential that the requirements from each strand dovetails with each other and the overall delivery programme aligns.

A good contract should set out the obligations of the parties in a way that is:

- Clear
- Complete
- Concise
- Unambiguous.

The procurement contract will also form the foundation for a productive relationship between the HA as customer and the supplier. This must be built on good communication and trust to be truly effective. The formal contract forms the framework around which a good relationship can grow. If the contract was poorly constructed, it will be much more difficult to make the relationship a success. The contract should include as appropriate:

- A precise definition of what is to be provided and requirements to be met as clarified through Stage 2
- An agreed level of service and mechanism for payment reduction if it is not met
- Means to measure performance (KPI)
- Pricing mechanisms including where appropriate milestone payments, incentivisation/rewards, retentions, and if the contract is for more than 2 years, price variation mechanisms
- Plan to cover implementation/transition/rollout
- Acceptance strategy/test plan
- Ownership of assets and intellectual property
- Escalation and alternative dispute resolution (ADR) procedures
- Change control procedures
- Invoicing arrangements
- Communication routes, typically at three levels
  - o Operational (end users/technical support staff),
  - o Business (contract manager and relationship manager on both sides)
  - o Strategic (senior management/board of directors)
- Contract management arrangements

- Collection and sharing of management information
- Agreed exit strategy and agreed break options
- Premises (where the goods/services will be delivered)
- Any sub-contractor details
- Authorities and responsibilities.

The above considerations are generic contract requirements providing an indication of areas for consideration in the preparation of the contract. Additional consideration may be necessary in the preparation of the contract with respect to the specific operational environment of the HA network. The continuity of operation of the HA network would be imperative but limited disruption may be necessary in order to implement the pilot. The limits of this disruption must be clearly defined. Similarly the extent of permitted access to control and equipment rooms must be clarified.

### **Step 3.3 – Innovation development**

Through this step the innovation and the associated assessment systems and services as specified through Stage 2 will be developed.

Through step 3.3 the innovation will be developed in accordance with the design requirements specified in Stage 2. If needed, a prototype should be developed first to allow the performance test and refinement.

Progress against the agreed implementation plan must be regularly monitored. Early signs of slippage or emerging issues that could cause slippage must be identified and actions developed to address them accordingly.

Factory and site acceptance requirements will have been defined within the procurement requirements. The detailed planning and implementation of the associated test schedules must be rigorously considered to ensure that all the requirements specified in Stage 2 can be verified and validated.

If there are any necessary changes to the programme or the requirements stringent change control procedures and checks should be implemented. Having considered the implications of any resultant modifications upon the innovation and the pilot these must be agreed with all parties involved.

### **Step 3.4 - Installation**

During this step the innovation and the associated assessment systems and services as specified through Stage 2 will be implemented and installed at the pilot location.

The implementation and construction of pilots on the HA operational network will require significant planning to ensure the impacts on road users and others is minimised.

Through this stage the impact of the pilot upon the travelling public stakeholders is likely to be at its maximum. This will be particularly apparent through any disruption caused through the construction period. A proactive communication plan should be adopted, particularly for larger pilots, to publicise significant milestones and include suitable activities to maintain positive end user stakeholder involvement within the pilot, such as press releases.

Road space booking and any associated traffic management arrangements must be arranged at an early stage in the project planning to ensure the availability of and access to the pilot site as and when required.

The implementation methodology must be acceptable to all involved in the pilot. This will include not only the innovation to be assessed through the pilot but also any assessment equipment to be installed. If needed an environmental impact analysis should be carried out to ensure the impact is minimal.

The Road Safety Audit (RSA) procedures should be carried out on the pilot including the relevant audit at this stage to identify any aspects of a pilot scheme that give rise to road safety concerns and, where possible, to suggest modifications that would improve the road safety of the resultant scheme **[HA 2003]**

As a highway authority the Highways Agency has a level of responsibility for the safety risk of the road user. It also has a health and safety responsibility for its workforce. The consideration of the safety risk for both road users and road workers must be considered and documented in accordance with legislation and the Agency's procedures for managing safety risk. Typically this is recorded in a safety report.

#### **Step 3.5 - Validation**

During this step the innovation and the associated assessment systems and services will be validated against the requirements specified through Stage 2.

This step is essential in confirming that all the requirements as specified in Stage 2 have been implemented and can be proved and the impact assessed.

Innovation commissioning and acceptance in accordance with the site acceptance tests and schedules agreed during step 3.3 will be actioned here. It is essential that this is applied to all the pilot site equipment at all locations. Following the successful completion of the acceptance test approval certificates should be provided.

It is essential through this stage that a test schedule is developed. Sufficient training is provided to the operational and assessment teams to ensure correct use of the innovation through the pilot. The timing of this training should be effected at a time to ensure that the skills acquired can be implemented and practiced effectively.

## **6.2 Strategic Actions**

The application of robust project management principles must be applied through the implementation stage to ensure that the overall timescales, costs (including any contingencies), deliverables and qualities are attained.

The organisational structure, management roles and responsibilities, resources, deliverables and overall decision frameworks must be clearly defined and agreed by stakeholders.

The project management principles within PRINCE2 **[OGC 1998]** should be rigorously applied.

Particular attention through this implementation stage is the need to be clear about responsibility for the ongoing maintenance of the pilot. There is a need to undertake formal handovers and ensure that where operational systems are included there is clarity on roles and responsibility and the required level of input needed and any necessary handover documentation produced.

In this stage, the application of the stakeholder management strategy is crucial for the success of the pilot. The key decision makers should be clearly identified.

The risk strategy, supporting plan and register must acknowledge actual and potential threats to the successful delivery of a pilot and determine the activities required to minimise or eliminate them. The risk plan needs to be capable of integration into, or co-ordination with, the overall pilot programme.

Further information on the strategic activities can be found in Annex B.

### **6.3 Continuation**

Throughout Stage 3, consideration must be given to the overall continuation of the pilot. In particular the business case must be reviewed during the procurement step when a firm indication of the pilot costs will be apparent. Similarly during the validation step when checks will be made to ensure that all the necessary requirements of the innovation are provided.

The extent and depth of this viability review will be appropriate to the scale of the innovation under consideration. The scale of the pilot may require that an OGC Gateway 3 - Investment Decision Review may be carried out during of this stage.

Checklist 3 – Implementation in Annex C provides a summary of issues that should be considered, addressed and reviewed by the completion of this stage.

If an innovation cannot be validated against its overall requirements at the completion of Stage 3 the pilot should be terminated. An exit strategy to provide a smooth completion of the pilot at this stage will need to be developed and implemented. Whatever the reasoning, lessons can be learnt from this implementation stage and it is essential that these are collated and disseminated in accordance with the guidance provided in Stage 5.

If at the completion of Stage 3 the review concludes the innovation is attainable, it will progress to Stage 4.

### **6.4 Stage 3 Outputs**

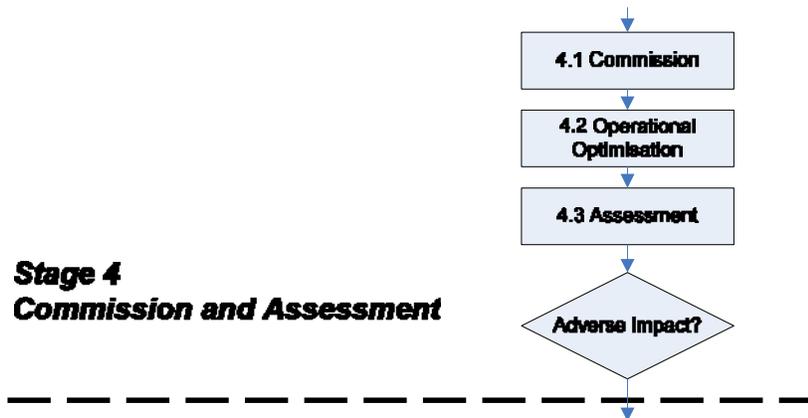
Typical outputs that might be expected from this stage include:

- (i) Innovation procurement contract
- (ii) Assessment procurement contract
- (iii) Operational improvement
- (iv) Updated business case
- (v) Updated project programme
- (vi) Updated resource requirements (including operations)
- (vii) Detailed maintenance strategy
- (viii) Updated stakeholder management strategy (including communication plan)
- (ix) Updated risk management plan and register.

The size and scale of the pilot will determine the extent to which each of these outputs is developed. It is expected that all these aspects will have been considered and form part of the overall stage review prior to continuation to Stage 4 or alternatively the termination of the pilot at Stage 3.

## 7 Stage 4 Commission and Assessment

### 7.1 Stage 4 Activities



**Figure 7.1 - Steps within Stage 4**

#### **Step 4.1 - Commission**

This step signifies the hand over point from the innovation provider to the Agency.

Following the successful validation of the innovation within Stage 3, against its specification, this step signifies acceptance by the Agency that all of the provider's obligations have been satisfied. At this point, with the exception of any warranty obligations, the innovation is now the responsibility of the HA.

Within this step the overall responsibilities will pass from the implementation team to the operations and assessment team. For smaller pilots this may be the same individuals however the roles and responsibilities could be significantly different. Prior to commissioning the implementation team will focus upon the successful delivery of the innovation according to the requirements specification

Depending upon the scale of the pilot this step may be staggered enabling partial acceptance of specified elements of the pilot. In such situations it is essential to precisely define the overall roles and responsibilities.

Close liaison between the implementation team and the operational and assessment team is very important to ensure the successful transition. Roles and responsibilities for all teams involved should be clearly defined and accepted by all parties. The Highways Agency Ramp Metering Deployment Plan [HA 2005C] provides an example of the considerations in this area.

#### **Step 4.2 - Operational Optimisation**

This step aims to optimise the overall performance of the innovation through a period of calibration and fine tuning.

The innovation may require calibration and fine tuning to ensure that the optimum performance on site can be attained. This is particularly true for pilots involving the consideration of ITS solutions. This may take some considerable time before it is suitable to undergo overall assessment in accordance with the framework determined in Stage 2. The Highways Agency Ramp Metering – Summary Report [HA 2005D] provides an insight into the issues involved in the calibration of systems.

For implementation, all roles and responsibility should be clearly defined and agreed by all parties.

### **Step 4.3 - Assessment**

This stage includes the overall innovation's commissioning, its calibration and fine tuning and subsequent assessment in accordance with the predefined assessment framework.

Once the scheme is open to traffic, the gathering and interpretation of monitoring data would initially concentrate on identifying any untoward adverse effects (especially risky situations or even additional accidents), in order that these can be corrected without delay, or if this is not possible, consideration can be given to abandoning the pilot. The emphasis would then shift progressively to establishing the various impacts of the pilot with increasing accuracy and levels of confidence as data accumulates over time.

A monitoring and evaluation report must be prepared summarising the various results from the assessment and drawing conclusions from the pilot. Several formats for the final report may be required to ensure that all the identifiable stakeholders receive the appropriate summary information. The report should provide information to assess pilot scheme impacts at three levels of timescale:

- The immediate effects to enable rapid changes to be made to counteract any unforeseen, dangerous or other adverse outcomes
- Short term impacts to be identified early in the life of the scheme at reasonable cost and
- Medium to longer term, wider, impacts.

The latter two impacts will inform any subsequent applications of the technique and will establish the various impacts of the pilot with increasing accuracy and levels of confidence as data accumulate over time. It should be noted that different parties may be responsible for the different assessment levels.

While the evaluation experience from other pilots has highlighted the necessity of managing expectation, there is a need to ensure that when early results and reports are published appropriate caveats are included to ensure more robust results established over the longer term are not undermined.

Contingency plans should be developed that consider alternative strategies to be invoked should there be any untoward risk to the pilot users, for example, a serious accident or obvious adverse impact. In conjunction with this there should be continual monitoring of press reports for any publicity which may adversely affect the pilot.

## **7.2 Strategic Actions**

Through this stage the roles and responsibilities of all involved must be clearly defined and understood.

The timing and implementation of any surveys required for the assessment must be planned well in advance ensuring that appropriate conditions can be assured wherever practically possible, for example, avoiding holiday periods or major events.

This is a key stage in ensuring that all that was specified has now been implemented. Robust and detailed testing schedules will have been included within the procurement process.

Check that the maintenance team will be given sufficient handover details from the procurement team. This should include training as appropriate to ensure that the innovation can be effectively maintained and operated.

It is likely during this stage that there will be a closer involvement with the public which will introduce a range of additional potential risks. The consideration of alternative risk scenarios and the development of appropriate contingency plans through this stage will greatly improve responsiveness to these situations should they arise.

Further information on the strategic activities can be found in Annex B.

### **7.3 Continuation**

Through this stage it is unlikely that a pilot will be terminated however unforeseen results may become apparent with any pilot. The business case should be reviewed to ensure that assumptions made are still valid. The continuous monitoring and assessment of the pilot is an integral element of this stage and any adverse occurrences should be rapidly identified. Response to such situations, particularly those in connection with safety and the environments, must be swiftly implemented and appropriate consideration given to the termination or modification of the pilot.

If the implementation of the pilot has resulted in adverse impacts at any time through Stage 4 of the pilot consideration should be given to its termination. An exit strategy to provide a smooth completion of the pilot at this stage will need to be developed and implemented. Whatever the reasoning, lessons can be learnt from this innovation and assessment requirements stage and it is essential that these are collated and disseminated in accordance with the guidance provided in Stage 5.

If the pilot assessment concludes successfully it will progress to Stage 5.

### **7.4 Stage 4 Outputs**

Typical outputs that might be expected from this stage include:

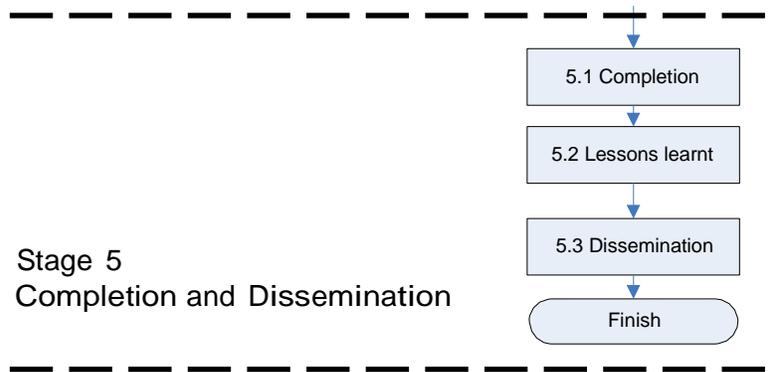
- (i) Calibration certificates
- (ii) Assessment report
- (iii) Updated business case
- (iv) Updated project programme
- (v) Updated resource requirements (including operations)
- (vi) Updated maintenance strategy
- (vii) Updated stakeholder management strategy (including communication plan)
- (viii) Updated risk management plan and register.

The size and scale of the pilot will determine the extent to which each of these outputs is developed. It is expected that all these aspects will have been considered and form part of the overall stage review prior to continuation to Stage 5 or alternatively the termination of the pilot at Stage 4.

## 8 Stage 5 Completion and Dissemination

### 8.1 Stage 5 Activities

Stage 4  
Commission and Assessment



**Figure 8.1 - Steps within Stage 5**

#### **Step 5.1 - Completion**

It is essential that the completion point in time of a pilot is clearly identifiable. This step will also ensure that should the innovation remain in place beyond the pilot end point that any relevant handover information is provided to the parties responsible for the ongoing maintenance and support for the pilot term.

The completion date for a pilot scheme or phase must be clearly defined. Without a clear end point the final assessment of a pilot's impact cannot be fully determined. This is particularly so for pilots assessing innovations close to the development of a nationwide standard.

Without a defined end date any hand over cannot effectively commence. If through piloting an innovation, areas for improvement/development are identified then agreement must be obtained for any revisions to the pilot objectives and programme.

Lack of clarity in the end date will result in the confusion of roles and responsibilities for the ongoing maintenance and operation of the pilot. This potentially could lead to a degradation of system performance and a loss in credibility that may have been established through the pilot which in turn may take considerable time to re-establish.

For some schemes, the longer term monitoring of specific aspects of a pilot may be necessary. For example, some broader safety aspects may only be apparent and identifiable over a long term whilst the functionality of a pilot could be very quickly determined. If so the pilot can be substantially completed and a plan made to determine the responsibilities, resources and levels of monitoring required for any longer term low level assessment. As part of the M25 Controlled Motorways [HA 2004] pilot the ability to control traffic using variable speed limits was established within the first few months of operation, however it was only after a period of 10 years and subsequent extension to the scheme that the safety impacts were established.

At a pilot's completion it is essential that any final deliverables are prepared and published in order that any standards for the wider adoption of the pilot concepts throughout the Agency's network can be developed. All final deliverables will be submitted to the Agency's Network Services Directorate - The Knowledge

Programme International, Collaboration and Supply Management Team for adding to the Agency's Knowledge Compendium.

(contact:knowledge.compendium@highways.gsi.gov.uk).

When completed, the innovation under consideration within the pilot will be decommissioned or alternatively handed over for ongoing support and maintenance. At this stage it is essential that all the appropriate supporting documentation, standards and information is collated, indexed and recorded. This will include any contractual and financial documentation and liabilities, instruction manuals, as-built information, risk assessments and hazard log, etc. If any document is outstanding, proper action should be planned, agreed and conducted by the relevant parties.

If the pilot is to be decommissioned all systems and services must be removed and returned, where practicable, to an 'as found' condition. In addition to redeploying resources and removing all equipment associated with the pilot from the operational site, including any assessment and monitoring systems, arrangements must be made to terminate any service provided for the pilot. This could include, for example, communication links or power supplies.

The archiving of all the relevant documentation, records, certificates, etc. in accordance with Agency procedures should be initiated and completed at this time. This will ensure that, if required, the basis for the pilot conclusions can be reviewed and examined in the future.

#### **Step 5.2 - Lessons Learnt**

Following its completion the lessons learnt at each and every previous stage will be collated and assessed.

The completion point of a pilot provides the opportunity for the overall outcome of the project to be reviewed. Consideration could be given, for example, to whether the initial aims and objectives and the contract conditions have been realised. It provides an opportunity to consider if these were too restrictive or alternatively not constrained enough.

The project completion is also the time to consider such aspects as what external factors outside the immediate scope of the pilot have changed that may have affected its outcome. This review should cover a broad range of issues extending through, but not limited to, any political, environmental or social aspects. This would include a review of the business case to check that the justification of the project was realistic and the expected benefits are being delivered.

The lessons learnt may also consider and subsequently develop the need for formal Standards/Advice Notes, although these will normally only be appropriate for successful outcomes.

A review of how all the stakeholders worked together is also appropriate at this stage. Consideration should be given, for example, as to whether their expectations have been realised or tempered as appropriate? Were they kept informed about progress throughout the pilot? Were any additional stakeholders identified as the pilot progressed?

The project completion is also the opportunity and time to consider what would have been done differently. What risks were envisaged that did not materialise, what health and safety or environmental issues arose, etc,

Consideration as to how the Agency has improved its core skills and capabilities should also be assessed. Does the Agency have additional tools and equipment that can now be widely deployed or are there limitations as to its use that should also be considered? Did the HA achieve the financial objectives?

All the lessons learnt should be summarised and recommendations made for any future application and importantly the resultant summary report should state how extensively the pilot met its objectives. It is important to recognise that not all lessons learnt will be positive and it is as equally important to ensure that there is broad awareness of any negative aspects.

### **Step 5.3 - Dissemination**

From the lessons learnt it is essential that these are disseminated to other interested parties.

It is a prime responsibility of a pilot practitioner to pass on the knowledge gained through the implementation of a pilot. If the pilot has been effectively organised and managed this is likely to primarily be 'good' news but the dissemination of the challenges encountered and how these were overcome is equally important.

The development of the communication plan, which is an integral part of the overall stakeholder management, will help to co-ordinate and to raise broader awareness of the conclusions and issues encountered through the pilot. This plan could include for example publications in Agency newsletters, technical papers to be published in journals, presentations given at seminars and conferences or general public awareness campaigns, etc.

It is important to liaise with the relevant HA communication team during the development of the communication plan in order to co-ordinate any publicity strategy, etc. Particularly where the completion of a pilot may have an impact on the travelling public there is a need for early monitoring of publicity to ensure that the HA can respond to enquiries and mitigate any negative comments not attributable to the scheme.

## **8.2 Strategic Actions**

The archiving of appropriate pilot information and data is an important aspect of this stage ensuring that all the relevant material can be retrieved should it be required.

It may be necessary to develop and provide training material associated with the handover. This training must include for all aspects of the systems and service assuming that no continuity of expertise will be available.

Both internal and external stakeholders will be interested in the impact of their contribution to and the overall outcome of the pilot. Depending upon the scale and impact of the pilot this may be achieved by sharing the information through articles in Network, a newsletter, seminars or a meeting/conference.

An assessment of the effectiveness and the breadth of aspect considered in the risk register will provide valuable lesson for future pilots.

## **8.3 Stage 5 Outputs**

Typical outputs that might be expected from this stage include:

- (i) Communication plan – publicity etc.
- (ii) Lessons learnt
- (iii) Input to standards
- (iv) Maintenance plan
- (v) Handover documentation
- (vi) Business plan review
- (vii) Risk review.

## **9 Acknowledgements**

This guide has been prepared by Atkins Ltd on behalf of the Network Services Directorate of the Highways Agency with support from the Department of Transport, the National Audit Office and other Agency directorates.

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## Annex A Pilot or Trial Category Selection and Approval Form

### PT1:Pilot or Trial category selection and approval

To be completed and sent with a <u>Financially Approved Business Case</u> to the relevant Divisional Director, along with a suitable <u>specification</u> .			
1. Pilot or Trial Requirement - to be completed by the Project Sponsor			
1.1	Project PIN:		
1.2	Pilot or Trial Title: (ideally the same as the PIN in Cascade)		
1.3 Brief Pilot or Trial description:			
2. Intended Pilot or Trial Cost (£)		Annual Breakdown of Costs (£)	
		Year 1	Year 2
			Remaining
	Net (£ <u>excluding</u> VAT)		
	VAT (adjust if non-standard)		
	Gross (£ <u>including</u> VAT)	0.00	0.00
			0.00
3. Timetable		Please allow sufficient time for your request to be processed and awarded (approx 4 weeks)	
3.1	Work on Pilot or Trial to commence...		3.2 and to finish...
4. Location		Please indicate where the proposed pilot or trial will operate- if multiple sites include ALL locations	
5. Similar Pilots or Trials		Please indicate previous pilots or trials similar in nature to the proposed pilot or trial - include ALL	

<b>6. Potential Impacts</b>				
6.1 Will the pilot or trial impact HA network operations?	<input type="checkbox"/> Yes (Tick if appropriate)			
If Yes provide brief details:				
6.2 Will the pilot or trial require co-ordination with the Regional Control Centres?	<input type="checkbox"/> Yes (Tick if appropriate)			
If Yes provide brief details:				
6.3 Will the pilot or trial have a high political sensitivity or likely press interest?	<input type="checkbox"/> Yes (Tick if appropriate)			
If Yes provide brief details:				
6.4 Will the pilot or trial impact Agency objectives (e.g. Improving Safety, Reducing Congestion and Improving Reliability, Respecting the Environment)?	<input type="checkbox"/> Yes (Tick if appropriate)			
If Yes provide brief details:				
<b>7. Pilot or Trial Category</b>				
<small>Pilots and trials are separated into different categories using the following:            Category A (Trial) – Minor scheme or project with minimum impact on network operations and business objectives e.g. new type of equipment cabinet paint.            Category B (Trial) – Medium schemes or projects which will not have any adverse impact on network operations and Agency business objectives, but will require co-ordination with regional Network Delivery and Development Directorate and Traffic Management Directorate teams e.g. new type of variable message sign.            Category C (Pilot) – Most significant schemes and projects, with high political sensitivity, press interest, RCC resource requirements or impact on Agency objectives, including safety and 'On Time' reliability measure e.g. Active Traffic Management.            The final decision on the category rests with the National Operations Group.</small>				
Select a Pilot or Trial Category: <input style="width: 100%;" type="text"/>	The Project Sponsor should advise NPG of any substantial changes to the specification following authorisation to initiate the pilot or trial.			
Actions to follow: <input style="width: 100%;" type="text"/>				
<b>8. Project Sponsor</b>				
Name:	<input style="width: 100%;" type="text"/>			
Division:	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 70%;"><input style="width: 95%;" type="text"/></td> <td style="width: 30%; text-align: center;">Cost Centre:</td> <td style="width: 10%;"><input style="width: 90%;" type="text"/></td> </tr> </table>	<input style="width: 95%;" type="text"/>	Cost Centre:	<input style="width: 90%;" type="text"/>
<input style="width: 95%;" type="text"/>	Cost Centre:	<input style="width: 90%;" type="text"/>		
Signature:	<input style="width: 100%;" type="text"/>			
Team Acronym:	<input style="width: 100%;" type="text"/>			
Date:	<input style="width: 100%;" type="text"/>			
<b>9. Regional Operations Board</b>				
I agree with the choice of the proposed Pilot-Trial Category				
Name:	<input style="width: 100%;" type="text"/>			
Signature:	<input style="width: 100%;" type="text"/>			
Date:	<input style="width: 100%;" type="text"/>			
Additional comments:				
<b>10. Network Performance Group</b>				
I approve/reject* the initiation of this Pilot or Trial (*delete as appropriate)				
Name:	<input style="width: 100%;" type="text"/>			
Signature:	<input style="width: 100%;" type="text"/>			
Date:	<input style="width: 100%;" type="text"/>			
Additional comments:				

## Annex B Strategic Activities

### B.1 A – Project and Programme Management

Project and programme management is the key to ensure a successful pilot. PRINCE2 [OGC 1998] is a structured project management methodology which provides clear guidance on the effective design and implementation of projects. The Agency has developed a Project Control Framework based on PRINCE2 principles.

PRINCE2 is a project management method designed to provide a framework covering the wide variety of disciplines and activities required within a project. The focus throughout PRINCE2 is on the Business Case, which describes the rationale and business justification for the project. The methodology also helps to manage risk, control quality and change effectively.

All projects should have clear timescales and objectives. A project should have the following qualities in order to improve the chance of a successful delivery:

- Stages: A grouping of tasks at the end of which a review will take place and a decision will be made as to whether to move on to the next stage
- Gateways: A decision or approval point mid-stage or between one stage and the next
- Milestones: Key points in time
- Resources: Money or staff time to ensure delivery
- Organisation: A management structure, with clear roles and responsibilities to ensure the projects success.

Within the Highways Agency there is an Ethos which under pins all aspects of the project delivery process. The Ethos defines the way in which project delivery should be carried out in the future. The Ethos fully embraces the Agency's requirement for continuous improvement. As a project, all pilots should follow this Ethos to ensure the successful delivery.

The Ethos defines three elements that should be used during project delivery. The successful delivery of any project depends on getting the balance between these three elements correct.

The first element is the 'Process' i.e. how the project is delivered.

Next is the Practical element i.e. the things to consider to plan and to deliver the pilot.

The final and most important element is 'People' i.e. the way the people behave towards each other.

Pilot managers should conduct the following activities to ensure successfully delivering pilots:

- Plan: Decide what needs to be done, when and by whom in order to achieve the objective
- Act: Put the above decisions into action
- Review: Review all parts of the project and identify if they have had the desired result
- Improve: Improve those parts of the project that did not have the desired result or could improve the likelihood of success next time.

The HA have introduced the 'Investment Control Framework' [HA 2007A] to ensure effective corporate governance regarding investment appraisal, and the control of income and expenditure in the Highways Agency. In particular to ensure;

- Best value for money.
- Effective management control and decision making.
- Good financial and contractual propriety.

Practitioners should follow the Investment Control Framework as required for all Agency projects. This means that all projects must be formally approved by an Investment Decision Maker and conducted in accordance with the Framework. The framework ensures that robust and visible financial and contractual delegations exist within the Agency. It also ensures compliance with the newly introduced DfT IAF, and where appropriate, the guidance of the Office of Government Commerce (OGC) gateway review process.

If necessary, an OGC gateway review should be carried out. The OGC Gateway process examines a programme or project at critical stages in its lifecycle, to provide assurance that it can progress successfully to the next stage. It is carried out at a key decision points by a team of experienced people, independent of the project team.

## **B.2 B - Stakeholder Management Strategy**

The purpose of the Stakeholder Management Strategy (SMS) is to ensure internal and external organisations participate and support the successful delivery of the pilot schemes. This will be achieved through the planned strategic management of defined stakeholders.

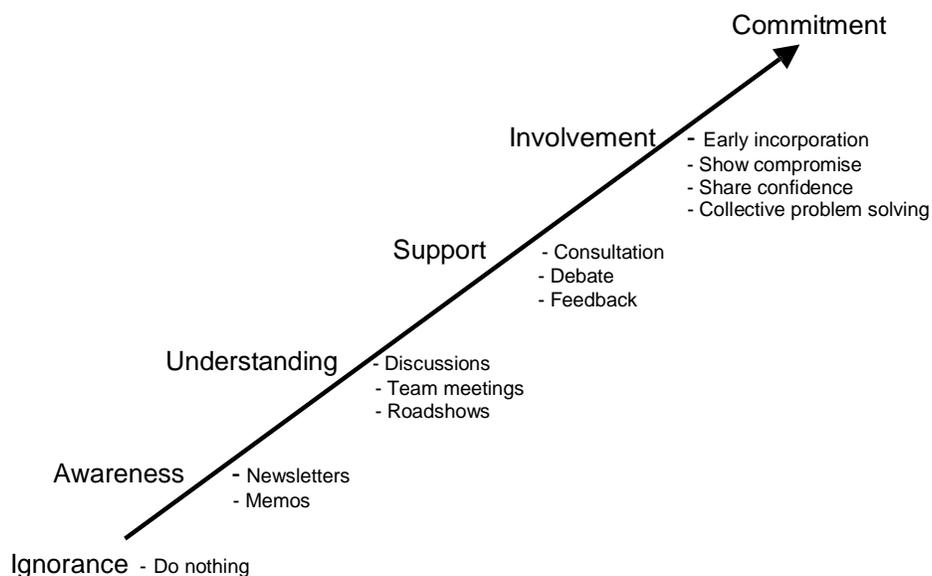
The specific goals and objectives of the SMS are to:

- Define the management strategies for stakeholder management
- To ensure full buy-in by all stakeholders including adjacent local authorities
- To ensure all level stakeholder support to permit other sub-groups to pursue their objectives without delay
- Define status of stakeholders
- To agree scope of participation of stakeholders
- Define the stakeholder communications management strategy
- To ensure full co-ordination of strategy with other parties.

The SMS will address the organisations responsible for the processes, people and policies/environments that will be affected by the pilot, consistently adopting the Agency's 'Writing with style', and will focus on ensuring the co-operation of all the stakeholder's people and policies.

### **B.2.1 General Approach/Principles**

The SMS seeks to achieve stakeholder commitment mainly through communication and influence. Using various techniques the strategy will be utilised to ensure stakeholders progression up the communications and commitment chain. Figure 3.1 depicts the key stages in achieving stakeholder commitment and some possible activities to achieve this.



**Figure B.1 - Communication and Commitment Chain**

Dependent upon the specific stakeholder, progression up the chain should be achieved using the activities outlined in the figure. Broadly speaking these can be categorised into the following instruments:

- Education/communication – explanation of the purpose of the pilot
- Participation – in the planning of the pilot
- Intervention – initiate stakeholders to develop the pilot
- Edict – command cooperation if necessary from those stakeholders over whom there is authority.

In addition the SMS address the requirement for stakeholder management at various levels. It is recognised from experience that gaining 'board level' support is insufficient to achieve commitment at an 'implementation level'.

The strategy would detail the management plan for each stakeholder with regard to where on the communication and commitment chain each identified stakeholder currently lies and where, accounting for impact/risk, it is preferred they reside.

The SMS would provide a framework for stakeholder management during the definition, design, development and implementation of the pilot. It will also provide an on-going structure that can be used for the scheme's operation.

The SMS will seek to address negative changes in the stakeholders' commitment. The most likely sources of a negative change in commitment are:

- Changes in political priorities
- Adverse publicity
- Change of pilot objectives
- Changes to the scope of the pilot
- Activities of other stakeholders.

By regular communication and feedback with the stakeholders these reactions should be predictable and mitigating measures can be taken.

### **B.3 C - Procurement and Maintenance Strategy**

The Highways Agency recognises that awarding contracts solely on the basis of lowest price does not provide value for money, either in terms of the final cost of construction or the through life and operational costs. In 2001 the HA set out a forward thinking procurement strategy which covers all categories of the work within the HA (<http://www.highways.gov.uk/business/1178.aspx>).

A number of basic principles have been set to all categories of work to achieve best value. They are aimed at building an incentivised team as early as possible before unnecessary constraints are introduced and which may restrict innovation. Taken together, the principles provide a framework which allows trust to be developed and encourages a culture which rewards added value and continual improvement. The incentives to suppliers are that the client will pay a fair and reasonable profit for a good service, in addition suppliers will be rewarded with a share of savings arising from innovative ideas and within the context of long-term relationships the main incentive will be continuity of work.

The principles of the procurement strategy are set out below:

- Early creation of delivery team - early contractor involvement for more scope in innovation, better risk management, and forward planning of work programmes and resources
- Integrated and incentivised supply chain - integrating the supply chain with its specialist knowledge, incentives for innovative ideas to give best value solutions
- Maintaining a competitive and sustainable supply chain - maintaining a good quality supplier base motivated and incentivised to work with the Agency
- Clear points of responsibility, no unnecessary layers of supervision - clarifying roles and responsibilities to reduce contractual interface problems, eliminating resource wastage from unnecessary layers of supervision
- E-procurement - to make tender processes, communications and performance measurement more efficient
- Selection of suppliers on the basis of best value - identifying the aspects of quality which add real, affordable value, using reality checks to confirm quality submissions and promises
- Fair allocation of risks - risks will be allocated to the party best able to manage them and the Agency will accept risks where suppliers are prepared to work in partnership to manage them and control the consequences
- High quality design - design solutions will be based on whole life value, assessed by reviews integrated with Office of Government Commerce gateway review processes. We are committed to achieving the principles of good design set out by the Government Strategy for Better Public Buildings
- Partnership approach based on long-term relationships - moving from short-term project partnering arrangements to long-term relationships for retention of skills and better resource and work programming
- Performance measurement with continual improvement targets - establishing a five-year programme of improvement under the Clients' Charter scheme to confirm benefits in the form of cost and time-savings, reduced defects and accidents, and improved whole life value and satisfaction with the product.

The HA procurement strategy emphasis on the longer term and whole life value is as applicable to the application of pilots as to the mainstream activities of the HA. The requirements for a sustainable development and the ongoing maintenance of an innovation must be high in the consideration of any innovation to be applied to the HA network.

Sustainable development means supporting a better quality of life through the efficient use of available resources to realise social progress and to maintain stable economic growth, while caring for the environment. A poorly specified brief or specification at any point in the supply chain can introduce or perpetuate waste and increase cost. Suppliers and the HA must take responsibility for the sustainability of its products as well as its processes. These, together with design quality are only achievable if integrated from the very beginning of the planning, design, construction and maintenance process.

Innovation is central to the Agency's work and it is committed to invest in Research and Development projects that will improve products and service delivery, while enhancing competitiveness and productivity among the supply chain. It will look for collaborative research opportunities with its suppliers, universities and local authorities as part of a knowledge improvement and sharing programme. Ideas for Research and Development will continue to be fed through the Network Services Directorate who manage the overall programme.

Within a pilot it is likely that intellectual property rights (IPR) will be an important feature. Early consideration about how these will be addressed could assist in reducing future problems.

The emphasis within the HA selection process is on quality aspects, seeking to select suppliers best able to identify optimal solutions and to deliver them efficiently and safely. Price is taken into account in terms of affordability and how much the HA will pay for added value. This, together with the quality/price ratio, will be determined on an individual pilot basis and will take account of the specific circumstances and requirements.

The selection process must also include consideration of the longer term resource commitment required by the HA and the provision of appropriate 'handover' and training by the supplier.

#### **B.4 D - Risk Management Strategy**

Risk is anything that could hinder the achievement of business goals or the delivery of stakeholder expectations. Risk can arise from failure to exploit opportunities as well as from threats materialising.

Risk Management is the culture, processes and structure aimed at managing potential opportunities and threats to an organisation.

The following diagram shows the Highways Agency strategic element of the Risk Management framework. It allows for senior management to be fully involved in:

- The identification of strategic objectives and the threats to their achievement
- Setting the high level 'culture' which exists in the Agency to encourage responsible risk taking at all levels to achieve VFM.



## Figure B.2 - Strategic element of the Risk Management framework

The practitioners should establish a risk register at the beginning of a pilot project and continually review and update it while the pilot is delivered.

### B.4.1 Risk Management Objectives

The objectives of a Risk Management Framework are to ensure the rapid identification of risk and opportunity within a pilot, providing a clear assessment of potential impact and mitigation, so that effective and timely decision-making can be undertaken to ensure that:

- pilots can be quickly assessed at an appropriate level in order to decide whether and how to proceed with such opportunities
- threats to the HA business strategies, programmes, major projects or other parts of its operations can be eliminated or otherwise reduced on an agreed basis
- all decisions are clearly premised on delivery of value to the HA.

The underlying principle is that all key risks to the HA strategy, programmes and projects are to be kept under regular review and reported through the various boards within the agency.

The Risk Management Process can be summarised as follows:

#### Risk Identification

Risk identification is critical to all decision making and problem solving, it is the foundation upon which all subsequent assessment and management is performed. HA Project Sponsors will need to be actively supported at all levels, from strategic down to supporting functions. They will be dependent on high quality processes in capturing and assessing risk and ensuring that a suitable management environment exists that supports rapid communication of risk up the line.

#### Risk Quantification

Where risks are likely to have a significant financial impact on objectives, such as a major pilot or undertaking, then the case should be made to examine the risks using a probabilistic technique such as QRA (Quantitative Risk analysis). Such techniques will model the combined impact of risk and its probability against key objectives to deliver the result in terms of a range of confidence levels in achieving our objectives.

#### Risk Management

Sizeable pilots or undertakings commit the HA to a significant investment in terms of resources and cost. Under these circumstances a Risk Management Plan must be prepared to ensure that the management of risk is explicit and clearly understood by all parties.

The risk management plan should identify the following: all the significant risks to the project, the entity who 'owns' those risks, what mitigation strategy is being adopted, the risk management 'Actions' together with the 'Action Owners' and the timescales for action.

#### Mitigation strategies

Risk mitigation is the process by which the initial risk is reduced to an acceptable level. The first step is to agree an acceptable form of risk mitigation - the mitigation strategy. There are basically four options available to treat risks at this stage:

- Avoid the risk - e.g. the pilot is too risky to consider, risks exceed rewards – avoid
- Reduce the risk - reduces the likelihood, or reduces the impact, do more investigative work

- Transfer the risk - keep the risk and manage it within the broader HA contingency provision in accordance with the agreed action plan
- Transfer to an insurance programme usually only cost effective in terms of catastrophic risk to protect the HA and usually applicable for low probability / high impact risks.

#### B.4.2 Benefits of the Risk Management Process

The benefits to a business from the proper management of risk are extensive:

- Encourage project sponsors to anticipate problems and to take action whilst the widest choice of options is still available
- Identify who is in the best position to manage the risks
- Enable risks to be allocated to the right party and to allow their management to be monitored
- Allow those with real project knowledge to express their concerns before things are allowed to go wrong
- Focus management effort on the issues of significance
- Develop more realistic programmes and cost plans, together with better contingency management
- Communicating the important issues to senior management
- Greater certainty in achieving the goals and objectives of the programme
- Appreciation of and readiness to exploit potential opportunities
- Focus management on the major risks to the exercise
- Actions implemented in time to be effective
- Improved control of related costs
- Informed decision making with regard to mitigation measures
- Efficient use of resources
- Clarity of roles and responsibilities for action
- Operational flexibility as a result of understanding all options and associated risks
- Fewer costly surprises through effective and transparent contingency planning
- Auditable process demonstrating by consensus and quantification how decisions are reached.

#### B.4.3 Risk Management Guides and standards

In addition to the HA's '[Framework for Business Risk Management](#)' there are a number of recognised government and industry standards and guides that address the management of project, programme and business risk. The most relevant guide is the OGC Management of Risk, however other relevant guides include:

- BS6079 Part 3:2000 Guide the management of business related project risk
- BS IEC 62198:2001 Project Risk Management - Application Guidelines
- Prince 2 (Office of Government Commerce)
- Managing Successful Programmes (MSP) (Office of Government Commerce)
- Project Risk Analysis and Management (PRAM) - 1997 (Association for Project Management)

Suggestions for items to include within a risk register can be found in the OGC Resource Toolkit **[OGC 2006C]**. The HA Ramp metering project risk register also provides an example of the areas for consideration **[HA 2006H]**.

Health and Safety Risk Management should be carried out in accordance with the Agency's Health and Safety Management System (HSMS).

## Annex C Checklists

### C.1 Stage 0 – Feasibility Checklist

This checklist has been prepared to provide an indication of areas that should be considered through this stage. It has been provided for guidance only and cannot be considered as a definitive list as additional aspects may be required dependant upon the innovation being piloted.

Considerations	
<b>Stage 0 – Feasibility</b>	Is the innovation to address a major issue or concern?
	Is the innovation in line with the HA vision?
	Does the innovation fit within with HA business plan?
	Can outline requirements and expectations of the innovation be clearly expressed?
	Does HA have the required capability & experience to trial/pilot the innovation?
	Is anyone else working in this area?
	How does this innovation differ from others?
	Are there any other similar innovations globally?
	What is the probability of success?
	Can other parts of UK Government provide assistance?
	If feasible have you completed a PT1 form and sent it to the Regional Operations Board / Network Performance Group?
<b>A - Programme Management: Programme</b>	What are the likely time frames for the overall programme?
	What is the likely duration of the pilot?
	Does this project impact on, or could it be affected by other pilots in the programme?
<b>A - Programme Management: Skills</b>	What skills are required?
	Are external skills required?
	Have the best skills within the HA been made aware of the innovation? Are they involved?
	Is there any conflict of interest?
<b>A - Programme Management: Resources</b>	Are resources available for the pilot?
	Has the project sponsor been selected and appointed?
<b>A - Programme Management: Financial</b>	What is the estimated cost of the pilot?
	What are the potential benefits of the innovation?
	What are the likely cost implications of implementing the innovation nationally over the HA network?

<b>B - Stakeholder</b>	Is there a stakeholder management strategy in place?
	Have all potential stakeholders been identified?
<b>C - Procurement</b>	What are the possible procurement options?
	Is there more than one party proposing this innovation? What are the partnership arrangements?
	Are there any Intellectual Property Right (IPR) considerations?
<b>D - Risk</b>	Have key risks been identified?
	Is the risk of the pilot/trial very high, high, medium or low?
<b>Learning Capture</b>	Have the HA fed in lessons learnt from other similar pilots?
	On balance should the innovation to be piloted proceed further at this time? Yes, No or at a later date

## C.2 Stage 1 – Aims and Objectives Checklist

This checklist has been prepared to provide an indication of areas that should be considered through this stage. It has been provided for guidance only and cannot be considered as a definitive list as additional aspects may be required dependant upon the innovation being piloted.

Considerations	
<b>Stage 1 – Aims and Objectives</b>	Is the innovation scope clearly defined?
	Are there any substantial changes to the scope of services or contract since the feasibility review?
	Have clear aims been identified for the pilot?
	Are there clear boundaries to the pilot?
	Are the pilots' objectives measurable?
	Have user needs been clearly identified?
	Does the innovation still align to the HA strategy?
	What are the unique selling points (USP) of this innovation?
<b>A - Programme Management: Programme</b>	What are the likely time frames for the overall programme?
	Are all milestones clearly defined and understood, and are they achievable?
<b>A- Programme Management: Resources</b>	Will resources be available when the pilot commences?
	If resources are not available, how else could the pilot be delivered?
	Are any sub-contracts or significant supply contracts involved?
<b>A- Programme Management: Skills</b>	Are the skills required within the HAs core competence? Do these need to be procured?
	Are there alternative ways of delivering the pilot?
	Can key deliverables be matched with internal / external skills?
<b>A- Programme Management: Financial</b>	Are potential impacts associated with the risk assessment realistic?
<b>B - Stakeholder</b>	What stakeholder consultation has taken place?
	How significantly will the pilot impact the stakeholders?
	Are there any other collaborators in this pilot?
	Has a Stakeholder Management Strategy been defined?
	Is there an understanding / commitment from all relevant HA internal parties?
<b>C - Procurement</b>	What is the proposed form of Contract / Agreement?
	Is a joint venture proposed? If so, what sort?
	Have the decision criteria been considered?

Considerations	
<b>D- Risk</b>	Has a Risk Log been developed?
	Is there a risk management plan?
<b>Learning Capture</b>	Have the HA fed in lessons learnt from other similar pilots?
	If the pilot terminates share the lessons learnt.
	On balance should the innovation to be piloted proceed further at this time? Yes, No or at a later date

### C.3 Stage 2 – Innovation and Assessment Requirements Checklist

This checklist has been prepared to provide an indication of areas that should be considered through this stage. It has been provided for guidance only and cannot be considered as a definitive list as additional aspects may be required dependant upon the innovation being piloted.

Considerations	
<b>Stage 2 – Innovation and Assessment Requirements</b>	Have the aims and objectives changed?
	Are there any substantial changes to the scope of services or contract since the aim and objectives review?
	Have functional requirements for the innovation been clearly defined?
	Have physical requirements for the innovation been clearly considered and defined?
	Have communication requirements for the innovation been clearly considered and defined?
	Do the detailed innovation requirements still align to the HA strategy?
	Can any changes to the requirements of the innovation be identified? Have their implications been considered?
	Is there any departure from HA standards? What is required to make the innovation a standard? Are these being assessed?
	Have potential performance impacts for the innovation been identified? Both positive and negative? Locally and nationally?
	Has a methodology for assessing the individual and collated impacts been developed?
	Is the co-ordinated assessment framework dependant upon activities outside the direct control of the pilot?
	Has a clear evaluation plan and programme been developed?
	Does the assessment framework make use of elements of the innovation? Can assessment be verified independently?
	What are the criteria for the pilot test location? How important are the various aspects?
	Have suitable sites been identified? Do they fully meet the criteria?
	Has a plan been developed to address health and safety and environmental impact concerns?
	For technology based pilots and trials, has the TTD Code of Connection been applied?
A – Programme Management: Programme	What is the service delivery programme?
	Are the milestones still clearly defined and understood, and

Considerations	
	are they achievable?
	Are key deliverables matched with a resource plan?
	Have resources been agreed with stakeholders?
	Are Health and Safety and / or Environmental Plans required and in place?
<b>A – Programme Management: Resources</b>	Are resources available for the job?
	Has a full staffing schedule been produced?
<b>A – Programme Management: Skills</b>	Are the skills required within the HA's core competence? Do these need to be procured?
	Can key deliverables be matched with the internal / external skills?
	Is there independence between the innovation and the assessment?
	Have the requirements been reviewed independently?
	Has the assessment framework been reviewed independently?
<b>A – Programme Management: Financial</b>	Are the potential impacts associated with the risk assessment realistic?
	Confirm that appropriate cost benefit assessments have been completed?
	Have cost estimates for the innovation been prepared? Including contingency?
	Has the cost of the assessment been estimated? Including set up and analysis?
	Have any cash flow predictions been mitigated against any risk assessment?
<b>B - Stakeholder</b>	Have all key people in the stakeholder's organisations been identified?
	Is there assigned responsibility to manage the relationship at all levels?
	Is there an understanding and commitment from all relevant HA internal parties at the appropriate level of authority?
	Has a communication plan been developed?
<b>C - Procurement</b>	Is the form of Contract / Agreement agreed?
	Are there any additional legal responsibilities such as CDM, Principal Contractor duties?
<b>D - Risk</b>	Has the Risk Log been updated?
	Are there any specific Safety / Environmental risks?
	Has the risk management plan been reviewed?
	Are there risk mitigations in place?

**Considerations**

<b>Learning Capture</b>	Have the HA fed in lessons learnt from other similar pilots?
	On balance should the innovation to be piloted proceed further at this time? Yes, No or at a later date

## C.4 Stage 3 – Implementation Checklist

This checklist has been prepared to provide an indication of areas that should be considered through this stage. It has been provided for guidance only and cannot be considered as a definitive list as additional aspects may be required dependant upon the innovation being piloted.

Considerations	
<b>Stage 3 Implementation</b>	Has collection of 'before' data commenced?
	Are there any substantial changes to the scope of services or contract since the requirements review?
	Is there a clear set of pilot deliverables?
	Is there any departure from HA standards? Have approvals been sort?
	Is a prototype to be developed? Does it need to be refined?
	Have clear test schedules for the innovation/assessment framework been developed?
	Have all the pilot site stakeholders been consulted? Concerns addressed?
	Any site access concerns/requirements?
	Has sufficient 'before' data been collected prior to commissioning?
<b>A – Programme Management: Programme</b>	Are the key deliverables matched with a resource plan?
	Have resources been agreed with the stakeholders?
	Are Health and Safety and / or Environmental Plan required and in place? Do they need updating?
<b>A – Programme Management: Resources</b>	Are resources in place?
	Have satisfactory contractual arrangements been finalised with any sub-contractors / significant suppliers?
<b>A – Programme Management: Skills</b>	Are the internal and external roles and responsibilities clearly defined?
	Can key deliverables be matched with the internal / external skills?
<b>A – Programme Management: Financial</b>	Have cost estimates for the innovation been reviewed, including contingency?
	Has the cost of the evaluation plan been updated? Including set up and analysis?
	Are potential impacts likely to exceed the innovation costs?
<b>B - Stakeholder</b>	Have key people in the stakeholders' organisations been identified?
	Is there assigned responsibility to manage the relationship at all levels?

Considerations	
	Has a press release been prepared?
	Have PR opportunities been maximised?
<b>C - Procurement</b>	Does the pilot have a written agreement or contract?
	Have contract KPIs been agreed?
	Has a contract review been carried out?
<b>D - Risk</b>	Is a clear risk management plan in place?
	Is a robust change management procedure in place?
	Are contingencies clearly defined?
<b>Learning Capture</b>	Have the HA fed in lessons learnt from other similar pilots?
	On balance should the innovation to be piloted proceed further at this time? Yes, No or at a later date

## C.5 Stage 4 – Commission and Assessment Checklist

This checklist has been prepared to provide an indication of areas that should be considered through this stage. It has been provided for guidance only and cannot be considered as a definitive list as additional aspects may be required dependant upon the innovation being piloted.

Considerations	
<b>Stage 4 – Commission and Assessment</b>	Has a schedule to calibrate the innovation been developed?
	Are roles and responsibilities clearly defined?
	Has the assessment framework methodology been implemented?
<b>A – Programme Management: Programme</b>	Are the key deliverables matched with a resource plan?
	Is the project programme in place? Does it need updating?
	Are Health and Safety and / or Environmental Plans required and in place? Do they need updating?
<b>A – Programme Management: Resources</b>	Are all the resources in place?
	Have satisfactory contractual arrangements been finalised?
<b>A – Programme Management: Financial</b>	Did the HA achieve the financial objectives?
<b>B - Stakeholder</b>	Have relationships been well managed?
	Have press releases been prepared?
	Have PR opportunities been maximised?
<b>C - Procurement and Maintenance</b>	Have critical success factors been achieved?
<b>D - Risk</b>	Is there a clear risk management plan in place?
	Is there a robust change management procedure in place.
	Are contingencies clearly defined?
<b>Learning Capture</b>	Have the HA fed in lessons learnt from other similar pilots?

## C.6 Stage 5 – Completion and Dissemination Checklist

This checklist has been prepared to provide an indication of areas that should be considered through this stage. It has been provided for guidance only and cannot be considered as a definitive list as additional aspects may be required dependant upon the innovation being piloted.

Considerations	
<b>Stage 5 – Completion and Dissemination</b>	Is there further opportunity for the development of the pilot?
	Have the pilot deliverables, records, certificates etc been archived?
	Have lessons learnt been disseminated?
	Have the project reports been sent to the Knowledge Compendium?
<b>A - Programme management: Skills</b>	Have the HA skills be extended through this pilot?
<b>A - Programme management: Programme</b>	Are there any outstanding deliverables, (and what action is taking place to complete)?
	Have project plans been completed?
<b>A - Programme management: Resources</b>	Have all non essential services or resources been decommissioned or redeployed?
	Have the resources/suppliers performed as expected and did they have the necessary skills for the pilot?
<b>A - Programme management: Financial</b>	Did the HA achieve the financial objectives?
	Is there any ongoing liability?
<b>B - Stakeholder</b>	Have relationships been well managed?
	Have press releases been prepared?
	Have PR opportunities been maximised?
<b>C - Procurement</b>	Have the requirements of the Contract been fulfilled?
	What are the residual liabilities?
<b>D - Risk</b>	To what extent did the identified risks materialise?
	Were additional risks identified that should have been identified earlier?
	Were the safety / environmental risks managed effectively?
	Has change management been robustly executed?
	Has contingency been robustly managed?
<b>Learning Capture</b>	Have the HA fed in the lessons learnt to other similar pilots?

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