



Submit by 5 January 2007

DARWIN INITIATIVE APPLICATION FOR GRANT ROUND 15 COMPETITION:STAGE 2

Please read the Guidance Notes before completing this form. Applications will be considered on the basis of information submitted on this form and you should give a full answer to **each** question. Please do not cross-refer to information in separate documents except where invited on this form. The space provided indicates the level of detail required. Please do not reduce the font size below 11pt or alter the paragraph spacing. Keep within word limits.

1. Name and address of organisation (NB: Notification of results will be by post)

Name: Royal Botanic Gardens, Kew	Address: Wakehurst Place, Ardingly, West Sussex RH17 6TN, UK.
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2. Project title (not exceeding 10 words)

ORCHID SEED STORES FOR SUSTAINABLE USE (OSSSU)
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3. Project dates, duration and total Darwin Initiative Grant requested

Proposed start date:	Duration of project:			End date:	
Darwin funding requested	2007/08 £ 83367	2008/09 £ 44239	2009/10 £ 45620	2010/11 £ 46823	Total £ 220049

4. Define the purpose of the project (extracted from logframe)

<p>To create an orchid seed bank network across 16 countries to:</p> <p>(1) conserve, as seed, 250 species from diverse habitats of varying levels of endangerment; and</p> <p>(2) develop protocols for the production of in vitro plants in support of the sustainable use of threatened species.</p>

5. Principals in project. Please provide a one page CV for each of these named individuals

Details	Project Leader	Other UK personnel (working >50% time on project)	Main project partner and co-ordinator in host country/ies
Surname	Pritchard		(Asia hub) Perner (Americas hub) Jijon
Forename (s)	Hugh Wynford		(Asia hub) Holger (Amer. hub) Carolina
Post held	Head of Research		(Asia hub) Senior Advisor (Amer.hub) Executive Director
Institution	Royal Botanic Gardens Kew		(Asia hub) Huanglong Nature Reserve Administration. (Amer.hub) Fundacion Botanico de los Andes
Department	Seed Conservation		(Asia hub) Key State Lab of Systematic and Evolutionary Biology, CAS (Americas hub) Jardin Botanico Quito

6. Has your organisation received funding under the Darwin Initiative before? If so, give details

Reference No	Project Leader	Title
		The Royal Botanic Gardens Kew has received 22 grants from the DI since 1992

7. IF YOU ANSWERED NO TO QUESTION 6 describe briefly the aims, activities and achievements of your organisation. (Large institutions please note that this should describe your unit or department)

Aims (50 words) NA
Activities (50 words) NA
Achievements (50 words) NA

8. Please list the UK/collaborative (where there are partners in addition to the applicant organisation) and host country partners that will be involved, and explain their roles and responsibilities in the project. Describe the extent of their involvement at all stages, including project development. This section should illustrate the capacity of host country partners to be involved in the project. Please provide written evidence of partnerships.

(Asia) India: Dr M Ahmedullah, Botanical Garden of the Indian Republic, Delhi.
(Africa) RSA: Dr TJ Edwards / Prof J van Staden (Univ KZNatal Pietermaritzburg)
(UK) Prof Michael Hutchings: Prof. of Plant Ecology, specialising in orchids and Trustee of Orchid Conservation International – see Supporting Documents 2 for letter of support

9b. Do you intend to consult other stakeholders? ✓ Yes No

If yes, please give details:

We intend to vigorously explore opportunities to extend the network, which will only be possible by access to alternative funds.

9c. Have you had any (other) contact with the government not already stated? ✓ Yes No

If yes, please give details:

The scientific hubs have consulted government regarding the project: in Ecuador, the Ministerio del Ambiente, and in China, the Administration of the Huanglong National Nature Reserve, Sichuan (see Dr Tang Siyuan's letter of support).

PROJECT DETAILS

10. Please provide a Concept note (Max 800 words) (repeat from Stage 1, with changes highlighted)

The need for a global network of orchid seed storage facilities for sustainable use was raised for the first time more than 20 years ago at the 11th World Orchid Conference (1984, Miami). This general need was re-iterated in the Orchids Status Survey and Conservation Action Plan of the IUCN/SSC Orchid Specialist Group (1996), which stated that "seed banking has great potential for orchid conservation because long-term seed storage will allow one to maintain an enormous array of species very economically." The *Action Plan* also recommends the sustainable use of germplasm through the "propagation of plants where possible from seed, usually in aseptic conditions" and that "orchid societies, establish and support *ex situ* propagation units in countries with high orchid biodiversity." The Proceedings of the Second International Orchid Conservation Congress (Sarasota, 2004) continued the call for conservation by proclaiming "that, by 2010, 90% of threatened orchids will be in *ex situ* collections" in support of Target 8 of the GSPC. This project aims to help reach that target. Whilst the threat to orchid species through, inter alia, habitat fragmentation and over harvesting is accepted to be of considerable concern, the exact number of orchid species (out of > 20000) that are threatened remains conjecture. This situation will change as in many of the countries with whom we have corresponded, including Ecuador and China, we understand that in-house red-listing of orchids is underway. Importantly, we have through discussion identified countries that cover many of the accepted biodiversity hotspots for orchid species. Indeed, our potential list of collaborating institutes / countries embraces thousands of orchid species. Although in many cases the countries do not have fully functional BAPs, the desire to support positive action on orchid conservation and sustainable use is absolutely clear from the supporting correspondence we have received (see above). In addition to responding to this overdue need for action, numerous other targets of the GSPC and CBD will be supported by this project (see Legacy and sustainability).

The key host country partners are Ecuador and China, who will act as regional, scientific hubs and training sites; they with the other countries will undertake conservation activities (seed harvesting, storage), laboratory studies (including germination protocol development), maintain conservation collections, develop education programmes and disseminate outputs. The UK partners will, inter alia, provide technical backstopping, offer back-up storage, act as the clearing house for orchid seed conservation biotechnology information, and manage the project.

11a. Is this a new initiative or a development of existing work (funded through any source)?

Please give details:

This is a new initiative

11b. Are you aware of any other individuals/organisations/Darwin Initiative projects carrying out similar work? Yes No

If yes, please give details explaining similarities and differences, and explaining how your work will be additional to this work and what attempts have/will been made to co-operate with and learn lessons from such work for mutual benefits:

The closest match for this orchid project is the DI Project on 'Conservation and monitoring of Meso-American orchids' (Project number 14-001). Whilst the project has an in situ rather than ex situ focus and is limited to one country (Costa Rica), OSSSU will enable the Director of Lankester Gardens to enhance the value of orchid collection made under 14-001 as a conservation tool. As mentioned at Stage 1, we are tracking discussions between Orchid Conservation

International and Studio 108 regarding orchid conservation in Cuba and see excellent opportunities to link to any emerging project as Phil Seaton is a Trustee of OCI. Such an association between projects would generate additional positive publicity for the DI. In addition, this project will exchange information with Kew's Millennium Seed Bank Project., which has modest orchid conservation activities in two key African countries for orchid diversity (Madagascar and Tanzania) and in Queensland, Australia to ensure that the guidelines produced on orchid conservation are of global relevance.

12. How does this project meet a clearly identifiable biodiversity need or priority defined by the host country? Please indicate how this work will fit in with National Biodiversity Strategies or Environmental Action Plans, if applicable.

The vast majority of partners in the project (including Pritchard and Seaton) are, and will continue to be, active members of the IUCN ex situ conservation committee, and advocates for national orchid conservation programmes. They have a commitment to conservation and the infrastructure developed throughout this project will enhance both continued local and international collaboration. The establishment of this network is seen as the first step to a global network of orchid seed banks with the objective ultimately of linking at least 30 countries, to embrace more orchid biodiversity hotspots. Completion of the project will lead to the provision of state-of-the-art infrastructure in many of the participating countries and in the case of Cuba re-establishing a functional laboratory facility, which will support Cuba's commitment to continuing technical support for this conservation work. All countries are signatories to the CBD and letters of support, especially from the two hub countries, have indicated a long-term pledge to maintain this work. The project aims to facilitate action in a co-ordinated fashion to meet global conservation objectives.

Specific actions in support of country BAP will be realized through the careful selection of species for inclusion in this project. So far, the indicative list of orchids for conservation covers > 250 species and 100 genera. Of these, approximately 10% are paphiopedilums, all of which are listed in Appendix I of CITES. Moreover, a significant proportion of slipper orchids are under severe collection pressure. Similarly, certain Colombian *Cattleya* species covered by this project are endangered. Finally, we are aware of the current global efforts (e.g. Colombia, Ecuador, Brazil, Costa Rica) to update orchid species red-listing and OSSSU will take account of these at the annual project planning stage.

13a. How will the project assist the host country in its implementation of the Convention on Biological Diversity? Please rank the relevance of the project to the relevant article(s) of the CBD thematic programmes and/or cross-cutting themes by indicating percentages.

The project shall support the Governments' implementation of Articles 5 (20%), 9 (25%), 10 (15%), 12 (15%), 13 (5%), 15 (5%), 18 (5%), 19 (5%) and 22 (5%) by promoting the sustainable use (propagation) of species (including ornamentals), engendering co-operation between government bodies and the private sector, developing a network capable of facilitating co-operation in conservation research and protocol development, and building infrastructural and human capacity for orchid conservation. OSSSU is of relevance to the following themes: Access and Benefit Sharing; Forest and Mountain Biodiversity; Global Strategy for Plant Conservation; Protected Areas; and Sustainable Use and Biodiversity

13b. Is any liaison proposed with the CBD national focal point in the host country? Yes No
If yes, please give details:

Copies of the project reports will be sent to the CBD focal points in the countries to encourage their involvement in OSSSU, and invitations to attend the research capacity building workshops extended to the focal points in the scientific hub countries.

14. If relevant, please explain how the work will contribute to sustainable livelihoods in the host country. (Max 200 words)

Many of the >250 OSSSU species are of socio-economic importance at national and regional levels, and some species at the international trade level. The generation of robust germination protocols will support mass propagation of orchid species, which with subsequent marketing could have a significant impact on sustainable use within countries. This can be realised at the sustainable livelihood level through an OSSSU education programme embracing the general public

with

and local nurserymen. This will not be achievable in all countries, but we will seek to establish best practice guidelines for the translation of laboratory research into local application in close collaboration Ecuador, China and India, as they have prior experience in this area.

15. What will be the impact of the work, and how will this be achieved? Please include details of how the results of the project will be disseminated and put into effect to achieve this impact. (max 200 words)

Scientists across sixteen countries will create and share knowledge about the conservation of orchids, resulting in a better understanding of orchid seed germination in vitro and how to conserve these tiny seeds over the long-term. This will lead, ultimately, to increased use of local species for the benefit of local communities (see 14 above) and for better management of genetic resources. To achieve this OSSSU will train orchid scientists across the world via workshops, support collaborative research, enhance information exchange, produce new knowledge on seed germination for targeted species and revise orchid seed storage guidelines. In addition, OSSSU will ensure the conservation of 250 orchid species as seeds, which will contribute to Target 8 of the Global Strategy for Plant Conservation, i.e. threatened species in accessible ex situ collections. OSSSU will also engender greater co-operation between the diverse groups interested in orchid species within countries, thereby improving the dialogue on conservation and sustainable use between scientists, governmental bodies, commercial organisations, orchid society members and the public. Dissemination of information across this complex mix of stakeholders will enhance both an appreciation and delivery of national conservation programmes, particularly as they relate to orchids. Wider impact will be achieved by cascade training to undergraduates and post-graduates at the universities involved and to a wide audience through a public education programme and web releases of the storage guidelines and germination protocols. These activities aim to attract 'fresh-blood' to the conservation movement.

16. How will the work leave a lasting legacy in the host country or region? (max 200 words)

The legacy of the OSSSU project will be:

- (1) the first functioning network of orchid conservation biotechnologists and their associated institutions across the globe.
- (2) trained staff who are competent in orchid seed banking, in vitro germination techniques and monitoring, collections management and information sharing. Much of the knowledge / techniques gained will be broadly applicable to the remaining (c. 20000) species in the orchid family, thus facilitating the involvement of the collaborating institutes in future orchid conservation projects.
- (3) better opportunities for collaborating institutes to become involved in long-term conservation projects as a result of strengthened institutional infrastructure (laboratory and storage facilities).
- (4) seeds of > 250 species committed to long-term conservation for the benefit of future generations.
- (5) guidelines on orchid seed conservation and sustainable use in three languages.
- (6) greater awareness in each country of the importance of conservation.

17. Please give details of a clear exit strategy and state what steps have been taken to identify and address potential problems in achieving impact and legacy. For example, what steps have been

taken to ensure the benefits of the project will continue despite any staff changes in these organisations? (max 200 words)

The development of a cadre of orchid conservation specialists across the world should ensure continuing formal and informal network exchange of technical information with and through the IUCN Orchid Specialist Group. In addition, the institutes invited to participate in OSSSU have long-standing orchid science interests and many have already confirmed at the project planning stage their desire to continue such work after the completion of OSSSU. Importantly, the opportunities for institutes to find further funding in orchid seed conservation projects will be significantly enhanced as a result of the experience and training gained during OSSSU. Funding opportunities will be a key item on the final workshop agenda and we intend during OSSSU to encourage syndicate-type approaches for funding prior to that stage. In terms of maximising impacts within each institute and reducing the risks of key staff changes, OSSSU will train more than one staff member per institute and the institutes are committed to providing cascade training internally following the workshops.

18. How will the project be advertised as a Darwin project and in what ways will the Darwin name and logo be used? (max 100 words)

OSSSU will use the name the Darwin Initiative and the logo on all general communications, on the web-site and at the workshops. Each participating country will develop a media plan to raise awareness of the DI support for OSSSU and all dissemination outputs (hard copy and verbal presentations) will acknowledge DI 's contribution to OSSSU.

19. If your project includes training and development, please indicate a) who the trainees will be, b) the criteria for selection, c) what the level and content of training will be, d) how many people will be involved, e) which countries will they be from, f) how will you measure the effectiveness of the training, g) will those trained then be able to train others and h) how will trainee outcomes be monitored after the end of the training? (max 300 words)

- a) Trainees should be staff members of the collaborating institutes.
- b) Trainees will be selected on the basis of some prior-experience of orchid seed biology. If staff do not have this background, we will seek a clear indication from the collaborating institute that their work programme / job description will soon include responsibility for handling orchid seeds. All trainees will submit a training needs assessment and a cv, which will enable the trainers (primarily Pritchard and Seaton) to plug existing gaps in knowledge and skills to meet partner's priorities and needs in relation to their agreed contributions to the project.
- c) Many of the trainees will have some prior-knowledge of methods and these will be reinforced during the workshop through practical sessions and introductions to the underpinning theory. All training materials (including powerpoint presentations) will be made available to attendees. The general level of the training will be between final year undergraduate and master's level.
- d) 32 trainees (i.e. aiming for 2 per collaborating institute). Additional staffs of the hosting institute / country (Ecuador and China) are expected to attend, but these numbers should not exceed about 5 additional staff per country.
- e) All participating countries (i.e. 16)
- f) Trainees will be provided with a course evaluation form at the end of the week to comment on the content, pace of delivery, quality of lectures, practicals and handouts.
- g) Many of the trainees are associated with higher education institutes and botanic gardens and there is an expectation that they will be capable of cascading knowledge gained to undergraduates and to the public.
- h) We will follow up the training with a questionnaire to the line managers of those trained seeking evidence of the benefits of the training in the workplace. We will also be able to judge this to a certain extent by the quality of the work presented in the annual reports.

NB There will be two training workshops: one in Ecuador, the other in China. There will also be a final project workshop in Year 3 at which all countries are expected to present their results and share their experiences with the other participants. This final meeting (4 day) will involve international organisations / policy makers, including IUCN

LOGICAL FRAMEWORK

20. Please enter the details of your project onto the matrix using the note at Annex C of the Guidance Note. This should not have substantially changed from the Logical Framework submitted with your Stage 1 application. Please highlight any changes.

Project summary	Measurable Indicators	Means of verification	Important Assumptions
<p>Goal:</p> <p>To draw on expertise relevant to biodiversity from within the United Kingdom to work with local partners in countries rich in biodiversity but poor in resources to achieve</p> <ul style="list-style-type: none"> • the conservation of biological diversity, • the sustainable use of its components, and • the fair and equitable sharing of benefits arising out of the utilisation of genetic resources 			
<p>Purpose</p> <p>To create an orchid seed bank network across 16 countries to: (1) conserve, as seed, 250 species from diverse habitats of varying levels of endangerment; and (2) develop protocols for the production of in vitro plants in support of the sustainable use of threatened species.</p>	<p>Number of countries actively contributing to the science and sharing information</p> <p>Number of countries wishing to join network (EoI)</p>	<p>DI annual reports, Bulletin Board traffic, etc.</p> <p>Correspondence</p>	<p>No breakdown in communication and trust between UK lead and the collaborating institutes leading to cancellation of MoUs.</p> <p>No institutional realignment</p>
<p>Outputs</p> <p>Improved 'in-country' facilities for seed storage and in vitro germination;</p> <p>Trained staff in orchid conservation biotechnology</p> <p>Data and germination protocols, and storage information;</p> <p>Training materials in Spanish, Chinese and English</p> <p>Distributed, searchable electronic database</p> <p>Advisory replies to enquiries</p> <p>Conservation collections of seeds / in vitro plants created / strengthened</p> <p>Public talks (in-country) on integrated conservation strategies and procedures</p>	<p>16 countries</p> <p>> 32 trainees (plus cascade to many more)</p> <p>250 species</p> <p>1 set of guidelines on orchid seed conservation</p> <p>1 created</p> <p>Response to enquiries within 30 days of receipt</p> <p>1 multispecies collection per institute</p> <p>At least 1 per year per institute</p>	<p>Institutional annual reports</p> <p>Attendance lists and workshops reports</p> <p>Publications and web uploads</p> <p>Refer to OSG site</p> <p>Accessible in all 16 countries</p> <p>Correspondence</p> <p>Collections databases held locally</p> <p>Posters / web site notices and head count record</p>	<p>Impact of altered institutional budgets tolerable</p> <p>Loss of trained staff from institutes minimal</p> <p>Species germination is not intractable</p> <p>Cost of any translation needs not increase prohibitively</p> <p>Interoperability between countries / software</p> <p>Filing is efficiently performed</p> <p>Created collections maintained adequately / continuity of care</p> <p>Publicity reaches the target audience</p>

<p>Activities Equipment purchase Information consolidation and distribution Species seed collected and conserved, database created Produce in vitro plants via germination. Organise and run two training courses, write and distribute training materials; Education programme established</p>	<p>Activity Milestones Y1: Sign MoUs (12/07); two training workshops (10-11/07); purchase equipment (10/07 – 3/08); initiate lab work (11/07); collect, clean, store and sow c. 40 orchid species (all year); establish and operate clearing house(CH) , and web site (3/08); design data base (3/08); public lectures (all year). Y2 (all year): Collect, clean, store and sow c. 90 orchid species; update database & operate CH; publications and lectures. Y3: Collect, clean, store and sow c. 90 orchid species; update database & operate CH; publications and lectures (all year); Y4: (all year): Collect, clean, store and sow c. 20 orchid species; update database & operate CH; publications and lectures; hold final workshop; issue final guidelines</p>	<p>Assumptions Export of major items from UK avoided; Kew access to databasing and other e-literature maintained and systems compatibility globally; Easy access to (targeted) species / plants / seeds continues; Power supply remains regular and infrastructure intact; Sufficient staff of appropriate calibre identified and available for the courses. Fits institutional priorities / timelines</p>
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21. Provide a project implementation timetable that shows the key milestones in project activities.

Project implementation timetable		
Date	Financial year	Key milestones
Summer 2007	Apr-Mar 2007/08	Plan detailed content of workshops and liaise with host countries on logistics, final costs, etc and send out a draft MoU for consideration before the workshops. Request collaborators start orchid pollinations for seed supply.
Oct 2007		Launch OSSSU Project; 1 international press release (Kew); national press releases in each of partner countries; write press releases for popular international orchid press (<i>Orchid Review</i> - UK, <i>Orchids</i> – USA);
Oct-Nov 2007		Hold two 5-day training workshops in Ecuador and China, review any outstanding issues around MoU, start receiving signed MoUs.
Nov 2007		Initiate laboratory and storage work
Dec 2007		Complete signing of MoUs with participating countries
Dec 2007 – Mar 08		Purchase small items of equipment
Jan 08		Promote OSSSU at World Orchid Conf, Miami
Mar 08		Establish and operate clearing house(CH) mechanism for orchid seed biology information and the web site; design interoperable information data base
Oct 07 – Mar 08		Collect, clean, store and sow c. 40 orchid species
Oct 07 – Mar 08		Promote project in institutional newsletter
Apr 08	Apr-Mar 2008/09	Submit OSSSU annual report (2007-8)
Throughout year		Collect, clean, store and sow c. 90 orchid species; update database & operate CH;
Throughout year		Draft guidelines on orchid seed germination and storage (as 2 booklets)
May 08		Initiate series of public lectures in all institutes to promote conservation and publicise OSSSU to coincide with world biodiversity day
Apr 09	Apr-Mar 2009/10	Submit OSSSU annual report (2008-09)
Throughout year		Collect, clean, store and sow c. 90 orchid species; update database & operate CH; public lectures and national conference presentations
Dec 09		Identify speakers for final conference and start planning logistics
Apr 2010	Apr-Mar 2010/11	Submit OSSSU annual report (2009-10)
Throughout		Collect, clean, store and sow c. 20 orchid species; update database &

<p>(half)year Throughout (half)year July – Aug 2010 Sept 2010 + 3 mo</p>		<p>operate CH; deliver public lectures; Publication of protocols for germination of 250+ species</p> <p>Hold final workshop (4-days) in Africa with view to expansion of network to the continent. Location to be decided.</p> <p>Prepare and submit final project report</p>
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22. Set out the project's measurable outputs using the separate list of output measures.

PROJECT OUTPUTS		
Year/Month	Standard output number (see standard output list)	Description (include numbers of people involved, publications produced, days/weeks etc.)
Oct-Nov 2007	4B 8 15A 15B 15C 15D 19D	32 technicians trained for 5 days (a total of 128 trainee days) 2 weeks in country 16 national press releases 16 local press releases 1 international press release, for broadsheet newspapers and radio (Kew press office support) and 2 Kew newsletter articles (Samara and Kew Scientist) 1 local press release 1 local radio interview (Hereford & Worcs)
Dec07 – Mar08	20	Laboratory equipment (refrigerators etc. £1000 x 16 = £16000)
Apr08-Mar09	7 7	1 Booklet describing seed storage techniques in Chinese, Spanish and English 1 Booklet describing seed germination techniques in Chinese, Spanish and English
Aug-Sept 2010	11A 12A	1 paper summarising the findings produced during the project period 1 common database summarising media suitable for germination for 250 orchid species
July – Aug 2010	14A 8	1 conference to be held in Africa 2 members of staff (Pritchard / Seaton) to organize 4 day conference Africa
Throughout	17B	Enhanced capacity of Orchid Specialist Group Ex situ Conservation Group to advise and assist in seed storage and micropropagation of orchids
Difficult to know timing	23	Aim to raise at least £20,000 through collaboration with Studio 108 for a vehicle and upgrading of lab facilities in Cuba

PROJECT BASED MONITORING AND EVALUATION

23. Describe, referring to the Indicators in the Logical Framework, how the progress of the project will be monitored and evaluated, including towards delivery of its outputs and in terms of achieving its overall purpose. This should be during the lifetime of the project and at its conclusion. Please include information on how host country partners will be included in the monitoring and evaluation.

Regular contact will be maintained with all partners by the Project Manager. Partners will exchange e-bulletin on a monthly-basis and have regular informal telephone meetings to discuss and review progress. The project will be monitored quarterly and evaluated against the targets of the project set through tracking the progress in each institution in terms of:

- (a) Identifying plants in collections for hand pollinations, and carrying out such pollinations
- (b) Monitoring numbers of seed lots stored, establishing, maintaining and updating the database.
- (c) Publications / articles in preparation, submitted and published
- (d) Reports produced and press releases
- (e) Number of visitors to facility.
- (f) we will establish a Kew Advisory Committee to review progress every six months; this may include an external advisory (Prof M Hutchings, Univ Sussex)

Where appropriate, actions will be taken to ensure that targets are met.

There will be a final workshop involving one representative from each of the host countries, to discuss the outcomes and promote furtherance of the seed banking network.

The partners will play a critical role in the successful implementation of agreed protocols within country and will be responsible for preparing a six-monthly and annual reports on their work. The Management Team will use these reports to review the quality of the data generated, and the speed of progress against the timetable