



**SHINWAR TO DUR BABA ROAD CONSTRUCTION PROJECT  
NANGARHAR, AFGHANISTAN**

**ENVIRONMENTAL ASSESSMENT**

**November 19, 2008**



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**INTERNATIONAL RELIEF AND DEVELOPMENT**

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**KABUL, AFGHANISTAN**

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## ABBREVIATIONS/ACRONYMS

AASHTO: American Association of State Highway and Transportation Officials  
ACI: American Concrete Institute  
ADB: Asian Development Bank  
ADM: Architectural Design Manual  
ADT: Average Daily Traffic  
AED: Afghanistan Engineer District  
AIA: Afghan Interim Authority  
AISC: American Institute of Steel Construction  
AMAC: Area Mine Action Center  
ANE: USAID Asian Near East Bureau  
BEO: ANE Bureau Environmental Officer  
BLI: BirdLife International  
BMP: Best management practices  
CFR: Code of Federal Regulation  
CIA: Central Intelligence Agency  
COCB: Community Outreach/Capacity Building  
CTO: Cognizant Technical Officer  
CY: Calendar Year  
DbA: Decibels  
EA: Environmental Assessment  
EPA: US Environmental Protection Agency  
FHWA: Federal Highway Administration  
FONSI: Finding of No Significant Impact  
HEC: Hydrologic Engineering Center  
H&H: Hydrology and Hydraulics  
HMS: Hydrologic Modeling System  
HTRW: Hazardous, Toxic, and Radioactive Waste  
IUCN: International Union for Conservation of Nature and Natural Resources  
IMAS: International Mine Action Standards  
IRD: International Relief and Development  
IRoA: Islamic Republic of Afghanistan  
IUCN: International Union for Conservation of Nature and Natural Resources  
Km: Kilometer  
L: Liter  
M: Meters

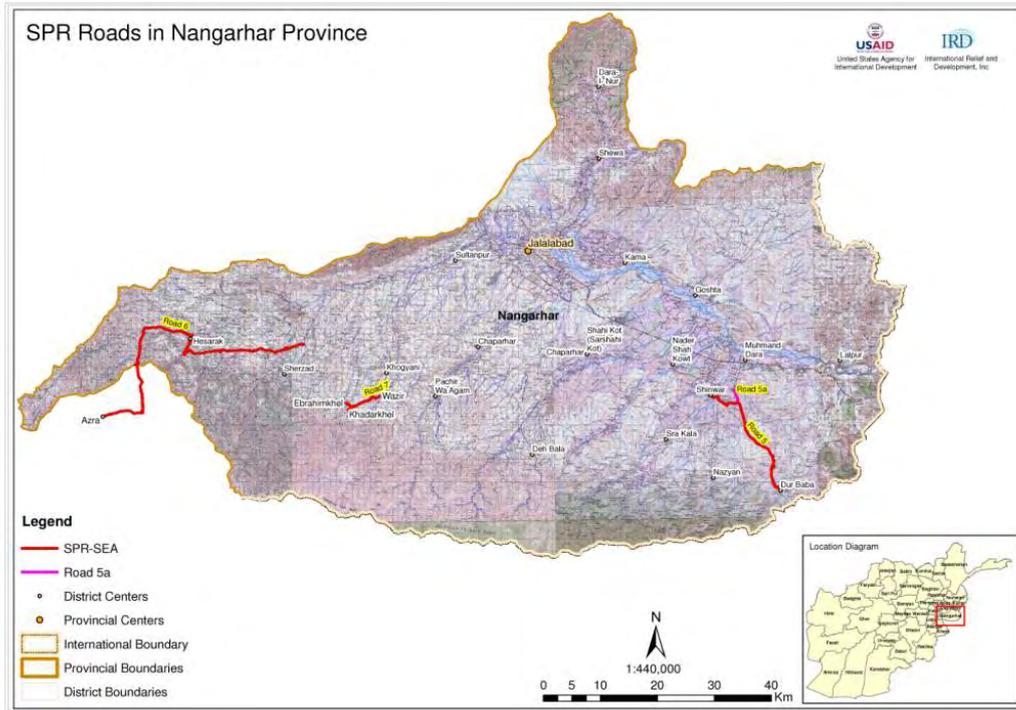


MOIC: Afghanistan Ministry of Information and Culture  
MSL: mean sea level  
m<sup>3</sup>/sec: cubic meter per second  
NAAQS: National Ambient Air Quality Standards  
NEPA: National Environmental Policy Act  
NGO: Non-governmental agency  
NRCS: Natural Resource Conservation Service  
SPM: suspended particulate matter  
PIEE: Programmatic Initial Environmental Examination  
PRT: Provincial Reconstruction Team  
RAS: Rivers Analysis System  
RHS: Right Hand Side  
ROW: Right of way  
SPR-SEA: Strategic Provincial Roads-South and East Afghanistan  
T & E: threatened or endangered species  
UN: United Nations  
UNMACA: United Nations Mine Action Center Afghanistan  
UNEP: United Nations Environment Program  
US: United States  
USACE: United States Army Corps of Engineers  
USAID: United States Agency for International Development  
USAID BEO: USAID Bureau Environmental Officer  
UXO: Unexploded ordnance

## **SECTION 1 SUMMARY OF FINDINGS**

### **1.1 Background**

In order to support the people and Government of Afghanistan, and to improve transportation in the region, the United States Agency for International Development (USAID) proposes to rehabilitate an estimated 25 kilometer (km) aggregate surface road between the district centers of Shinwar and Dur Baba in the Nangarhar Province of Afghanistan (Figure 1.1). The proposed project is part of the larger USAID-funded Strategic Provincial Roads – Southern and Eastern Afghanistan (SPR-SEA) road rehabilitation program. As part of their Afghanistan reconstruction efforts, USAID, donor nations and other agencies identified areas where projects will have the most beneficial impact in building alternative livelihoods, creating ownership for the Government and local people, and fighting terrorist activity. Afghanistan's existing road network has been severely eroded from neglect over the last 30 years. With the exception of the internationally-funded and partially completed Ring Road, network "roads" primarily consist of rough, gravel vehicle roads and ancient camel, goat, donkey and sheep caravan trails that have been expanded for use by modern vehicles. USAID is facilitating reconstruction and improvement of the existing secondary roads to create a regional and national road system which links the major cities, provincial and district centers and economic centers. Under the SPR-SEA program approximately 1500 km of secondary roads will be rehabilitated. Rehabilitation of roads such as the Shinwar to Dur Baba road will assist citizens living in outlying areas of the country to access better economic, healthcare and education facilities and opportunities. It is critical to Afghanistan's economy and security to develop a dependable secondary road network in the country (USACE-AED 2007).



**Figure 1-1 Location of proposed SPR-SEA roads within Nangarhar province**

This project will improve the transportation link between the villages of Shinwar and Dur Baba districts. It is also expected that the project will not only benefit the estimated 35,000 residents of the villages located along the ROW, but also the 1,280,000 residents of Nangarhar Province by increasing economic growth potential while creating an improved transportation infrastructure. A healthy environment and natural resources are essential for development of Afghanistan's economy. During the decades of war, a huge stress was placed on the environment which resulted in severe adverse impacts, especially affecting the poorest part of the population. Now the country experiences deforestation, erosion, shrinking biodiversity and natural habitats, depletion of underground and surface water with abrupt worsening of quality. For these reasons, sustainable development is extremely important for the country and all environmental impacts relating to development projects must be adequately addressed.

**This document is an Environmental Assessment (EA) prepared** to evaluate the impacts associated with the proposed project in accordance with sections 118(b) and 621 of the Foreign Assistance Act of 1961 as amended. USAID Environmental Procedures, 22 CFR 216 states that certain "classes of action have been determined generally to have significant effect on the environment and an Environmental Assessment or Environmental Impact Statement, as appropriate, will be required." In accordance with 22 CFR 216.2 (d)(1) penetration road building or road improvement projects fall within this class of actions.

These procedures also assign responsibility within USAID for assessing the environmental effects of its actions. These procedures are consistent with Executive Order 12114, Environmental Effects Abroad of Major Federal Actions. The

Environmental evaluation of the proposed development projects is also required under the Environmental Law of Afghanistan which was ratified by Parliament in 2007.

## **1.2 Major Conclusions**

### **1.2.1 Direct, Indirect, and Cumulative Impacts**

Environmental consequences resulting from the impacts of the proposed project include but are not limited to:

- Direct Impacts - Those directly due to the proposed project itself. These may include but are not limited to local land use changes; impacts to soils; temporary construction impacts (e.g., noise, air quality); hazardous, toxic, radioactive waste (HTRW) impacts, and borrow impacts.
- Indirect Impacts - Those resulting from activities prompted by the proposed project, but not directly attributable to it. These may include changes to the local economy and security of villages along the right of way (ROW).
- Cumulative Impacts - These are impacts that result when the impacts of the action added to the existing situation or to the effects of other reasonably foreseeable activities likely to take place regionally or over time.

Short-term beneficial and/or potential adverse impacts may include the generation of employment opportunities during the construction period; HTRW impacts; and temporary construction impacts, which may include changes in air quality and noise. Long-term impacts may include local land use changes; enhanced development opportunities; improved transport services; easier access to commercial and service facilities; improved security; and faster and more-reliable communications and commodity transport.

### **1.2.2 Major Direct Impacts**

Short-term air quality impacts during construction can be anticipated due to fugitive dust generation in and around construction activities and related activities such as plants for crushing rock. Levels of suspended particulate matter (SPM) may increase during the construction period.

Potential short-term noise impacts resulting from the proposed project can be identified in both the construction and operational stages. The magnitude of impact will depend upon the specific types of equipment used to move materials, the construction methods employed, and the scheduling of the work. Construction noise is generally intermittent and depends on the type of operation, location, function of the equipment, the equipment usage cycle. Construction noise attenuates quickly with distance.

Surface hydrological impacts could occur during road rehabilitation activities. Other short term water quality impacts could be uncontrolled runoff, disruption of irrigation, and effects of construction camp or staging area wastewater disposal and runoff.

Soils could be impacted by long-term loss of agricultural land, loss of soil due to erosion, and inadequate slope stabilization.

The proposed project is expected to have a long-term beneficial impact on the economy of both the local areas and the province as a whole by accommodating traffic and enhancing trade within the province by reducing the current travel time.

### **1.2.3 Major Indirect Impacts**

Geological resources could be affected for a short period of time due to project-induced demand for resources such as rock and sand. The project can be expected to have a beneficial long-term impact on the overall quality of the villages it serves by contributing to their infrastructure, economy, and security.

### **1.2.4 Cumulative Impacts**

Induced development has the potential to have major cumulative impacts along the ROW. Urbanization of the area may have impacts on land characteristics and use along the ROW. The proposed project will create a more-dependable roadway in the area, allowing for an increase in trade. Villages along the ROW may grow from the growth of local economies, which could impact agriculture and soils in their vicinity; farmland may be converted to urban development. Conversely, trade may promote an increase in farms, which could change the land use and hydrology (e.g., irrigation) of the area. (The road will undoubtedly improve access of the population to health and education facilities).

Along with economic growth, an increase in population may increase the probability for potential HTRW contamination. An increase in the variety and number of institutions that make up the infrastructure of the region is also probable.

#### **1.2.4.1 Mitigation Measures**

Air quality mitigation measures during the construction and operational stages of the proposed project may include the following measures:

- Generation of dust due to construction activities can be mitigated through avoidance strategies and monitoring.
- Potential significant adverse air quality impacts to adjacent residents or site employees during construction should be mitigated by either discontinuing construction until favorable conditions are restored, or, if warranted, sites may be watered to prevent dust generation.
- Pre-construction monitoring of existing ambient air quality may be undertaken to provide a baseline for the measurement of air quality impacts during the construction period if considered warranted by USAID.
- Routine air quality monitoring may also be required in areas of high potential impact (e.g., construction camps) during the life of the proposed project if considered warranted by USAID.

Mitigation measures for noise should be taken by machine operators and project managers. This may include requiring workers to wear proper hearing protection, and alternating the use of loud equipment during hours of rest for nearby dwelling areas. Precaution should be taken to minimize construction times, limit number of working vehicles, and use of noise barriers where warranted.

Potential adverse impacts to surface hydrology during the construction and rehabilitation phase of the project will be avoided through the enforcement of contract provisions and quality assurance oversight by International Relief and Development (IRD), the Grantee for the SPR – SEA program. Drainage provisions and other aspects of the project are not expected to alter the current status of natural water bodies and irrigation structures. In addition to adherence to good engineering and construction practices and the enforcement of contract provisions related to drainage during both the construction/rehabilitation phases of the project the subcontractor will be obligated to coordinate with local land use planning authorities. Contract provisions will ensure that construction camps and other potential sources of secondary impacts are properly sited and provided with drainage and wastewater facilities. Alternative water sources will be developed to offset disruption of irrigation.

Although the loss of agricultural land has been listed as a possibility in this instance virtually all construction and rehabilitation activities will be confined to the existing ROW and little or no loss to agricultural land due to road widening or realignment will occur.

Subcontractors should minimize traffic disruption by providing a detour route. Public information programs to alert the public of detours or delays will be implemented.

No significant wetlands exist in the proposed project ROW.

### **1.3 Areas of Controversy**

The phrase “Areas of Controversy” in this context is taken to mean areas of disagreement emerging from public comment and participation in the definition of the project and the proposed action. No such areas of controversy have emerged.

### **1.4 Issues to be Resolved**

No issues have been identified that relate to any potential environmental consequences resulting from the proposed action that need to be resolved.

## **SECTION 2 PURPOSE**

### **2.1 Purpose of the Proposed Action**

The purpose of this project is to reconstruct/rehabilitate an existing gravel road from Shinwar to Dur Baba. The proposed project will improve the transportation links between these two District Centers of Nangarhar Province. The purpose of USAID’s SPR-SEA program is to improve the transportation link between Provincial Capitals and District Centers. This type of road network is critical to developing Afghanistan’s economy and security.

## 2.2 Need of the Proposed Action

Need for reconstruction of this road was determined during the Nangarhar Provincial Reconstruction Team’s preliminary assessment mission, which was conducted in 2006. The road is located near the Pakistan border which could potentially make it a very important route for trade between Afghanistan and Pakistan. The existing road is presently in very poor condition. The last know maintenance or rehabilitation of the existing road was thirty years ago. It is anticipated that the road rehabilitation will result in expansion of cross-border trade and will benefit to the residents of the 13 villages located along the ROW. Because of the lack of adequate drainage, the existing road has several “washout” making travel through these areas very difficult. Discussions with the local authorities and elders confirmed the need to implement this project. The project will directly benefit both Shinwar and Dur Baba Districts and Nangarhar Province in general.

## SECTION 3 PROPOSED ACTION AND ALTERNATIVES

### 3.1 Analysis of Alternatives

This section describes the proposed action and alternatives that were considered to satisfy the purpose and need for the improvement of a reliable transportation route between Shinwar and Dur Baba. They are:

- Proposed Action: Reconstruct/Rehabilitate an existing gravel road with improved width, drainage and aggregate surface (Figures 3.2 and 3.3). The proposed road connects the district centers of Shinwar and Dur Baba.
- No-Action Alternative: No US government involvement.

This project is authorized and funded by USAID, and aims to provide a means for infrastructure, commerce, and local travel between the communities located along its ROW. The proposed project is part of a larger USAID-funded reconstruction effort for strategic provincial roads in the eastern and southern parts of Afghanistan.

### 3.2 Project Description

The proposed road is located in the Shinwar and Dur Baba Districts. The starting point of the project is located in the Ghanikhal bazaar in the village of Anar Bagh, Shinwar district approximately 40km to the south-east of Jalalabad and the end point is in the village of Dur Baba which is located about 2km from the Afghanistan - Pakistan border.

**Table 3-1 Geographical coordinates of proposed project**

|                                      |                          |
|--------------------------------------|--------------------------|
| Start Point Name: Shinwar            | End Point Name: Dur Baba |
| Start Point Coordinate:              | End Point Name:          |
| Northing 3785045                     | Northing 3768149         |
| Easting 42S 665931                   | Easting 42S 678103       |
| Project length- approximately -25 km |                          |

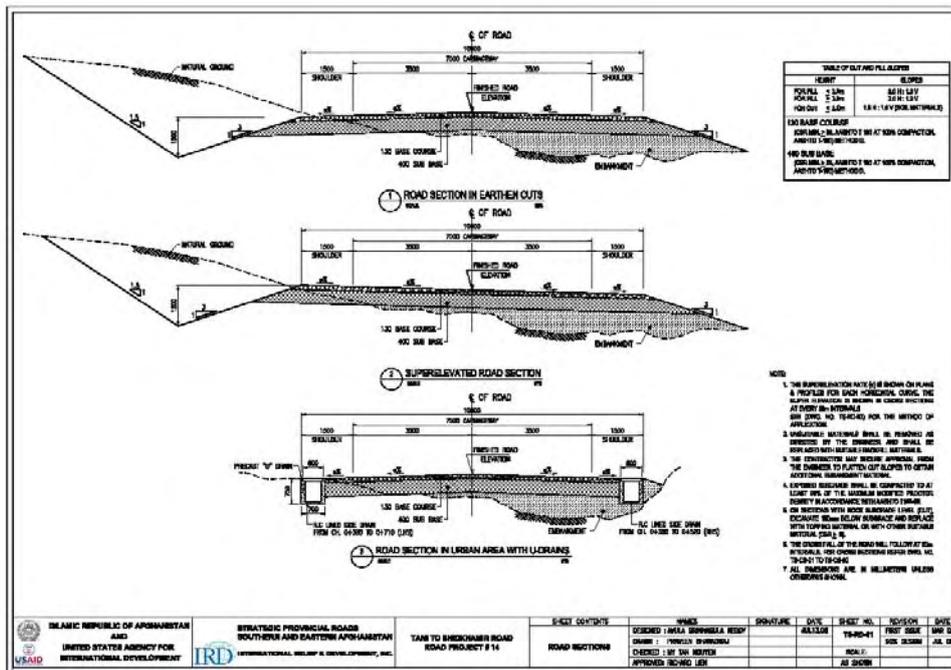
The typical cross section (figure 3.1) of the reconstructed/rehabilitated road will be a 7m wide wearing surface with two 1.5m shoulders in flat to rolling terrain. The proposed road section will include the following components upon completion:

- A dual lane, all weather, engineered, gravel road of dimensions 2 x 3.5 m lanes, and 2 x 1.5 m shoulders;
- Ancillary road furnishings, such as signage, road edge markers, etc;
- Erosion protection, possibly including embankments, riprap, dykes, stone or concrete walls, and lined side drains;
- Cuts and embankments with retaining walls to provide a platform for the road;
- Drainage structures including stone masonry box culverts with reinforced concrete slab tops ranging in size from 1.2 x 2 m to 2.7 x 4 m.

The Level 1 Demining/UXO report from UNMACA and the Regional AMAC indicates that no demining is required for the Shinwar to Dur Baba road. If landmines or unexploded ordnance (UXO) are identified, they will be avoided until cleared as per the International Mine Action Standards (IMAS).

Geological resources such as rock and sand will be used during construction. Specific sources used for road upgrading materials will depend upon the location of the segment being upgraded. Slope protection may be used to prevent falling rock in the borrow pits and rock quarries.

The road will be constructed above-grade for storm water protection. The road grade depends on the type of terrain encountered, with a maximum 2% grade and less than 1% grade for most of flat areas and less than 7% at the most steepest mountainous sections. There are no identified switchback grades on the road routing. Watercourse crossing structures, including but not limited to, culverts and causeways will be designed and installed as required during the construction of the road. A separate USAID contractor has documented the areas hydrology and submitted a design document to account for rainfall and drainage along the road route. Hydrological integrity of the watercourses cannot be guaranteed, but is not expected to be significantly affected by the proposed project. Watercourses are intersected by the existing gravel road, and washouts occur because of the erosion of fine soils that make up the existing road and a lack of adequate drainage structures. The new engineered road mitigates road washouts with improved aggregate surfacing, adequate drainage and erosion protection. The improved, sloped aggregate road surface provides additional strength to prevent water deterioration during times of increased water flow. In addition, culverts, retaining walls and shoulder storm water drainage will significantly improve erosion control within the ROW. Existing drainage structures will be replaced and new structures will be constructed as needed.



**Figure 3-1 Typical cross—sections for all SPR SEA roads**

The road will be reconstructed to either Association of State Highway and Transportation Officials (AASHTO) standards or Ministry of Public Works Interim Road and Highway Standards dated March 2007.



**Figure 3-2 Current conditions of ROW (station 4+285)**

Equipment, Raw Material and Waste Disposal required for project implementation

Equipment to be used in construction will likely include some or all of the following:

- Bulldozers
- Excavators
- Graders
- Vibrating compactors and rollers

- Mobile crane
- Tip trucks, water trucks, equipment transporters
- Dump trucks
- Rock crushing equipment and processing equipment (sieve, washer, etc.)
- Mixer trucks
- Mobile generator sets and compressors

Raw materials and components that are required for completion of the project are listed in Table 3.1.

On site storage will probably be required for:

- Steel reinforcement
- Cement
- Aggregate
- Timber/shuttering/formwork
- Clean water (and possibly raw water)
- Fuel

Waste generated by construction activities will include:

- Cleared material; soils and vegetation (excess or unsuitable fill, blasted rock, eroded soil, still from disturbance to river beds and banks).
- Construction materials; reinforcement bars, cement, etc.
- Wastewater; material wash and sewage.
- Solid Waste (litter and packaging).
- Oil and fuel spills

**Table 3-2 Types of raw materials required for the project**

| <b>Material</b>               | <b>Source</b>                     |
|-------------------------------|-----------------------------------|
| Borrow material for road base | Locally acquired                  |
| Aggregate for pavement        | Locally acquired and processed    |
| Aggregate for concrete        | Locally acquired and processed    |
| Sand                          | Locally acquired and processed    |
| Rock (rip rap material)       | Locally blasted rock              |
| Rock (masonry)                | Out-wash fans, or blasted rock    |
| Water                         | Underground wells                 |
| Cement                        | Manufactured and imported to site |
| Road furnishings              | Manufactured and imported to site |



**Figure 3-3 Shinwar to Dur Baba location map**

### *Design Standards and Publications*

Road designs will conform to the relevant current Islamic Republic of Afghanistan, Ministry of Public Works Interim Road and Highway Standards dated March 2007 and other publications that include, but are not limited to:

- AASHTO Policy on Geometric Design of Highways and Streets, Fourth Edition, 2001 (Green Book).
- AASHTO Guide for Design of Pavement Structures, 1993.
- Standard Specifications for Highway Bridges 11th Edition (2002) adopted by AASHTO. Additional references such as ACI, AISC, ASTM, etc., specifications shall also be adopted as necessary.
- The ADB TA No. 4371 AFG Master Plan for Road Network Improvement Project (Master Plan Component) – Final Report (April 2006) for ADT rate estimate.
- AASHTO Highway Drainage Guidelines, 2007 Edition.

- National Engineering Handbook part 630 of the Natural Resources Conservation Service (NRCS).
- US Army Corps of Engineers' Hydrologic Modeling System HEC-HMS and HEC-RAS.
- Hydraulic Reference Manual, version 3.1, Chapter 10.
- Hydrology Manual by Ven T. Chow is also used as a reference for the analysis of Hydraulic and Hydrologic data.
- US Federal Highway Administration, FHWA Hydraulics Design Series No. 5 Hydraulic Design of Highway Culverts.

### **3.3 No Action Alternative**

The no action alternative is to not reconstruct/rehabilitate the existing road from Shinwar to Dur Baba. Without the proposed project, the existing unimproved gravel road, which is one of the only access and trade route between Shinwar and Dur Baba, will continue to deteriorate. Travel on the existing road is considered very unsafe.

### **3.4 Alternatives Considered and Eliminated for Detailed Study**

In this document, the no action alternative is compared to the proposed action alternative of road reconstruction. This road project was selected and recommended by the Nangarhar PRT after consultation with the local village elders. The project was then reviewed by USAID/Afghanistan's Office of Infrastructure, Engineering and Energy and the Ministry of Public Works.

## **SECTION 4 AFFECTED ENVIRONMENT**

This section describes the environment and resources that may be affected by the proposed action. The resources described in this section are those resources recognized by laws, executive orders, regulations, or other standards of national, state, or regional agencies and organizations, as discussed below. The selection and order of the environmental issues to be discussed in this section is based on the analysis of environmental issues presented in the Programmatic Scoping Statement for Strategic Provincial Roads – Southern and Eastern Afghanistan. (ANE 08-105, approved 30 September 2008)

In regard to effects occurring outside the United States, 22 CFR §216.1(c) (10) defines the environment as “the natural and physical environment.” In addition to the natural and physical environment, this section will also address other environmental concerns identified in 22 CFR 216. The critical and urgent nature of the proposed action and the resulting accelerated schedule to prepare this EA precluded the ability to conduct intensive in-the-field assessments of the affected environment. Descriptions of the affected environment were garnered mostly from existing sources, and are by necessity general in nature and encompass the country of

Afghanistan. Some site specific data was also obtained, but it is limited because of aforementioned reasons and could not always be confirmed by reliable sources.

Afghanistan is located in Central Asia, north and west of Pakistan, and east of Iran. Afghanistan's economy has improved significantly since the fall of the Taliban regime in 2001 largely because of the infusion of international assistance, the recovery of the agricultural sector, and service sector growth. Despite the progress of the past few years, Afghanistan is extremely poor, landlocked, and highly dependent on foreign aid, agriculture, and trade with neighboring countries. Much of the population continues to suffer from shortages of housing, clean water, electricity, medical care, and jobs. Insecurity and the Afghan government's inability to extend rule of law to all parts of the country pose challenges to future economic growth. It is expected to take the remainder of the decade, and continuing donor aid and attention, to significantly raise the average Afghan's living standards from its current level, which is among the lowest in the world. While the international community remains committed to Afghanistan's development, pledging over \$24 billion USD at three donor conferences since 2002, Kabul will need to overcome a number of challenges including expanding poppy cultivation, budget sustainability, job creation, corruption, government capacity, and rebuilding war torn infrastructure (CIA 2005).

Years of civil war, compounded by Taliban rule and the worst drought in decades, have devastated Afghanistan. In 2001, when the Taliban was forced out of power, more than half of Afghanistan's people lived in poverty and were unemployed. Virtually all the country's institutions and much of its infrastructure were destroyed (CIA 2005). During this time Afghanistan had not only lost a generation of engineers and skilled labor but its medical care and education systems had been left in shambles. As a result, the median age is 17.6 years with more than 45 percent of the Afghan population under 14, and 53 percent between 15-64 years old. Unemployment is currently estimated to be 40 percent. Much of the population continues to suffer from shortages of housing, clean water, electricity, medical care and jobs (USACE-AED 2007).

Degradation of Environment and depletion of natural resources are also significant and visual consequences of the long period of instability including depletion of forest cover by 66.5% in the south-eastern part of the country over the last 30-year period. Wood is still the main source of energy for over 90% of households (Afghanistan Statistical Yearbook- 2007).

Despite the country's challenges, the Afghan government, the United States, and international donors remain committed to improving access to basic necessities by prioritizing infrastructure development, education, housing development, jobs programs and economic reform. Reconstruction projects include national and provincial road construction, water management studies and alternative power initiatives like micro-hydro power stations (USACE-AED 2007).

*National Environmental Regulations:* Until recently, Afghanistan had very poor legislation covering Environmental issues, although UNEP experts identified several laws containing Environmental provisions issued during the period from 1963 to 2000. Now, with the assistance of international institutions, Afghanistan is in the process of developing extensive environmental legislation and an institutional

network. The main piece of environmental regulation in the IROA is the Environmental Law which was published in Official Gazette January 25, 2007. This law is based on Article 15 of the Constitution of Afghanistan which imposes the state to adopt necessary measures to protect natural forests and living conditions of the country. The responsibility for implementation of the provisions of this law was issued to the recently established National Environmental Protection Agency (NEPA), with 288 employees currently. The NEPA is recognized as a main state authority with a large list of functions including:

- Coordination of all environmental affairs at the international, national and local levels
- Regular reporting on the environmental situation in the country
- Developing policies and strategies promoting sustainable development and plans for environmental management
- Providing environmental services including permitting for related activities.

In order to fulfill inter-institutional coordination the Committee for Environmental Coordination was created, with a sub-national committee in each province. The law includes provisions for Environmental Impact Assessments and public participation procedures.

#### **4.1 Baseline information**

Nangarhar Province is located in the south east of Afghanistan and has an estimated population of 1,289, 000 (2007). Approximately 86 % of the population is rural. The province is divided into 21 districts and has a total area of 7641.1square kilometer. The capital of Nangarhar Province is the city of Jalalabad. Jalalabad is one of the oldest and largest cities in Afghanistan. The estimated population of the city is 60,000. Educational facilities located in the city include a university with a total enrollment of 3,878 students (2004-05) and a medical school. 292 general education schools are located in the province. Approximately 350, 546 students (girls comprise 36% of students only 11% of total 5,992 of teachers are women) attend the schools. Medical services are provided by six hospitals with a total capacity of 650 beds and 38 Basic Health Centers. Medical personnel in Nangarhar Province are comprised of 172 doctors and 447 nurses (Afghanistan Statistical Yearbook, 2007). Over 90% of the population in Nangarhar Province is Pashtun. Other ethnic groups are Tajiks, Arab, and Pashai. Agriculture is a very important source of income for the local population. The main crops being grown are wheat, barley and maize. These crops are mainly grown on irrigated lands.

The alignment of the proposed road will be located within the Shinwar district (estimated population is estimated at 86,900) and Dur Baba (estimated population is of 29,000 (UNHCR, 2002). Ethnically the population in both districts is primarily Pashtun from the two major tribes Anar Bagh Shitaki and Siya Chop. The villages of this area are surrounded by mountains, therefore agricultural lands are limited. The available agricultural lands are well irrigated mainly by traditional (karez) methods.

### **4.1.1 Climate**

Afghanistan's climate is continental, arid to semi-arid, with considerable variations from place to place according to altitude. Its lowland areas have cold winters and hot summers. The mountains are extremely cold in winter and cool in summer. Winter lasts from October to May.

The proposed project area is located in the southern part of Nangarhar Province. The only reliable available climatic data for the project site are based on the data obtained from the weather station located in Jalalabad. The rainy season starts in November and continues through April/earlier May. There also is a short, intensive monsoon season in August and September. Absolute minimum ambient temperature is  $-1.8^{\circ}\text{C}$  which was recorded in February 1981 and absolute maximum  $48.5^{\circ}\text{C}$  which was recorded in June 1983. The area is mainly dry with an average annual rainfall of 219mm (1962-1981). Rainfall is the dominant form of precipitation. The climate of the region is affected by monsoons which originate in the Indian Ocean. This results in hot summers and mild winters. The southern part of project area is located at altitudes above 1,000m. This portion of the project area has the highest annual precipitation.

### **4.1.2 Air Quality**

Climate, particularly precipitation and wind patterns, is a major determinant of air quality. There are no existing significant sources of air pollution in the project area with the exception of fugitive dust occurring naturally during wind storms and the dust generated by vehicles traveling on unpaved desert tracks in the road ROW. Air quality within the proposed project area is believed to be within National Ambient Air Quality Standards (NAAQS) standards.

No area-wide air quality modeling studies for Nangarhar Province exist. However, it can be extrapolated that airborne particulate matter is high in the deserts of the region. The proposed project's location is in the eastern part of the country and skirts the Pakistan border.

Within the proposed project area, levels of suspended particulate matter are particularly high due to the use of unpaved desert tracks in the proposed road's ROW. No documentation of air quality in the proposed project area is known to be available, but the climatic and soil conditions of the proposed project area are such that it is likely to be subject to dust storms, particularly in the summer months, leading to higher levels of SPM. Generally, however, except for the effects of traffic, ambient air pollution levels outside of the urban areas are considered to be relatively low; cities generally have poorer air quality due to higher automotive emissions and concentrations of industrial activity.

### **4.1.3 Topography and Geology**

Afghanistan's topography is dominated by the Hindu Kush Mountains, which run northeast to southwest through the central portion of the country and divide the northern provinces from the remainder of the country. The southwest is occupied by desert plateau. The lowest point in the country is at Amu Darya at 258 meters above

mean sea level (msl). The highest point is at Nowshak, which is 7,485 meters above msl. The southern and western parts of the country are covered by deserts at elevations ranging from 500 to 1,000 meters above msl.

The proposed road alignment crosses various types of terrain, including flat, rolling and mountainous areas ranging in altitudes from 630 to 1400m above Mean Sea Level. Numerous wadies and gullies are located throughout the area. The flatter to slightly rolling terrain is located nearer Shinwar with more mountainous areas common in Dur Baba. Cultivated lands are located more in the Shinwar area.

Afghanistan's geological circumstances are complex. The earth's continental plates move, collide, break up and reform as a result of currents and upwellings in the mantle. The mountain chains comprised of the Hindu Kush, Pamir, Karakoram and Himalayan Ranges are believed to have been the result of a collision of the Indian Plate and Asia Plate which began approximately 50 million years ago and continues to the present day. The bedrock geology of Afghanistan can be assumed as pattern of crystal blocks separated by the zones of faulting with different amplitudes and direction of motion. As consequence the rocks are very diverse and range by age from Archean to Quaternary period. The country is abundant with mineral resources. Known valuable minerals found in Nangarhar Province are talc, asbestos and magnesium associated with ultramafic and metamorphic rocks (USGS-USAID, 2007). The gemstone Tatang occurs in association with pegmatite veins, lenses and veinlets in Silurian-Devonian sediments is recorded in the Northern part of the province (Orris and Bliss, 2002). However, there is no evidence regarding mining operations in vicinity of the proposed project road. Most of Nangarhar Province is covered by Quaternary deposits. Needed rocks and aggregate for the proposed project can be found in adequate quality and quantity in the local area.

**Seismicity:** Much of the country is known to be seismically active. There is a history of damaging earthquakes that are most frequent in the northeast, many of earthquakes with magnitude up to 5 occurred in project area. The Nangarhar Province is an area considered to have a considerable potential for moderate earthquake damage.

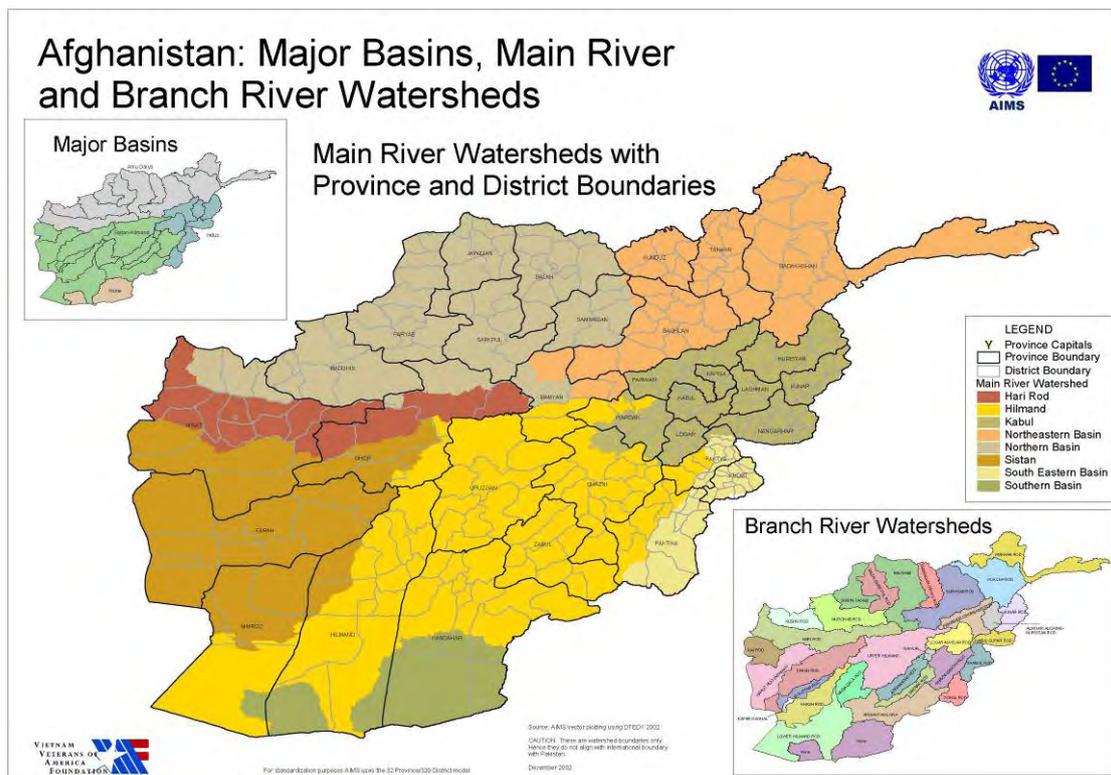
#### **4.1.4 Hydrology**

The water source of most of Afghanistan's rivers is the snow and ice-caps in the mountains. Water levels in the rivers vary greatly with the highest levels occurring in spring and early summer. In the remaining seasons the rivers may diminish to small streams or entirely disappear. Five major river basins can be differentiated in Afghanistan (Figure 4.1):

- **The Kabul Basin (Indus):** The Kabul Basin includes the Kabul and Logar Rivers and their tributaries which drain the eastern part of the country. The rivers within the eastern basin flow generally to the east and eventually join the Indus River and the Arabian Sea.
- **The Hilmand Basin:** The rivers of the Hilmand Basin flow generally to the southwest to the Lake of Sistan on the Afghanistan-Iran border and include the Helmand River, the country's longest river, the Farah River and the Khash

River.

- **The Northern Basin:** The rivers in the northern part of the country flow northward to the Amu Darya River on the country's northern boundary (and eventually to the Aral Sea) or disappear in the desert sands.
- **The Amu Darya Basin:** Amu Darya Basin has its headwater in the High Pamir Mountains of Afghanistan and Tajikistan. The Basin covers 14% of the national territory but drains more than 57% of the total annual water flow of Afghanistan. Therefore the basin has great hydropower potential that is largely unused.
- **The Harrirod – Murghab Basin:** The Harorod - Murghab river basin contributes a tiny 4% of the total flow of Afghanistan. The main rivers are the Hari River, which takes its source from the western slope of the Koh-i-Baba Mountains in the central highlands and the Murghab River, which comes from the Tir Band-I Mountains.



**Figure 4-1 Major Basins and Branch watersheds**

Perennial water bodies are fed by precipitation and snowmelt from distant mountainous regions. The proposed project area is a part of Kabul (Indus) basin, however most the watercourses located near ROW are ephemeral (e.g., wadis, which are dry watercourse beds that contain water intermittently, such as during rain events), and their water levels vary greatly, with the highest levels in spring and early summer. In the remaining seasons these watercourses may reduce to small streams or entirely disappear (Figure 4-2). The design plans indicate that no rivers, lakes or significant streams in the area will be crossed by the project. Irrigation is common in

agricultural areas because the arid to semi-arid desert climate of most parts of Afghanistan do not receive enough rainfall to sustain modern agriculture.



**Figure 4-2 Dry watercourse bed crossed by road alignment**

Existing irrigation networks are located within the ROW in the Shinwar section of road. A number of irrigation channels cross the proposed road and most of the drainage structures are in a poor condition (Figure 4.3). Several dry wadis also cross the proposed road alignment; therefore hydrological studies were required so that adequate drainage structures can be design. Catchment areas that cross the ROW were also studied to determine type of drainage structure that will be needed to be constructed across these areas. Existing water quality for these bodies of water is not known.



**Figure 4-3 Drainage structure at the existent road**

#### **4.1.5 Soils**

Within the country as a whole, the soils are characterized as high mountain serozems, desert steppe or meadow steppe. Loess soils are found in the north. The river valley soils are generally alluvial or meadow alluvial. Serozems and brown desert soils cover large portions of the country in the north and southwest (National Atlas 1995).

Only about 10 % of the lands adjacent to the alignment are agricultural lands. Overgrazing, deforestation, desertification, degradation of watersheds and erosion have been identified as significant environmental issues contributing to soil degradation and reduced soil productivity throughout Afghanistan.

Within the vicinity of the proposed project, soils are generally classified as mountain light serozems and brown desert soils (National Atlas 1995). The intervening soils of the semi-desert areas provide sufficient fodder to support nomadic and semi-nomadic herding of sheep, goats and camels.

#### **4.1.6 Hazardous, Toxic, and Radioactive Waste**

The project ROW is not known to contain HTRW.

#### **4.1.7 Natural/ Biological Resources**

##### **4.1.7.1 Flora**

Afghanistan's vegetation is typical of semi-deserts and steppes. Ephemeric vegetation grows in the sandy semi-deserts, and halophilous vegetation is found in the salt semi-deserts. The most common trees in the more humid soils are oak (*Quercus* spp.), ash (*Fraxinus* spp.), willow (*Salix* spp.), poplar (*Populus* spp.), and fruit trees in orchards. Himalayan forest, which is dominated by evergreen oak, grows in the borderland between Afghanistan and Pakistan (National Atlas 1995).

The country's mountains are believed to be home to many plants that exist nowhere else on earth. Unfortunately, areas supporting natural flora habitat are diminishing. The Asian Development Bank (ADB) reports that one of the most critical environmental problems of Afghanistan is massive deforestation and overgrazing, which could be aggravated by the return of refugees to the area. It is estimated that forest cover declined from 3.4 to 2.6 percent of total land area between 1970 and 1990. Since then, continued timber harvesting and the use of forest resources for fuel have reduced forest cover to less than two percent of the total area (Asian Development Bank 2007). Deforestation is an important issue for the southern part of Nangarhar province, where areas of natural conifer forest is rapidly disappearing. Small, fragmented conifer forest are outside of the project's ROW near the village of Dur Baba. Areas within or adjacent to the ROW have been heavily disturbed by human activities and are highly unlikely to provide habitat for rare or endangered plant species. Some wormwood, feather grass and halophilous vegetation exist along the road. The planted fruit trees grow near the road alignment only within the villages at the starting and end areas of proposed road. Figure 4.4 shows conditions along ROW.

#### 4.1.7.2 Fauna

Afghanistan is home to 119 species of mammals, 460 species of birds, four species of reptiles and hundreds of species of insects and fish. Thirty five species of animal have been listed as either vulnerable or endangered on the International Union for Conservation of Nature and Natural Resources (IUCN) Red List, however, the number of threatened species may be higher as essentially no wildlife research has been undertaken in Afghanistan for many years.

The fauna of Afghanistan is similar to that of the rest of Central Asia. Large carnivorous mammals believed to live in the mountains include the snow leopard (*Unica*), brown bear (*Urdus arcos*), wolf (*Canes spp.*), striped hyena (*Hyena*), jackal (*Canes spp.*), and fox (*Vulpine*). Hoofed animals are represented by the algali (*Ovis ammon polii*), the goitered gazelle (*Gazella subgutturosa*), and ibex (*Capra spp.*). Numerous species of birds, rodents, reptiles and amphibians have been reported to live in the area (National Atlas 1995).



**Figure 4-4 Semi-desert vegetation along the ROW**

The factors that make the project road ROW and the adjacent areas an unlikely venue for threatened and endangered plant species also make it an unlikely area for special status wildlife species. Field investigations revealed no evidence of existing conditions for habitat of endangered and threatened fauna.

#### 4.1.7.3 Sensitive Habitat and Protected Species

Afghanistan's Environmental Law contains provisions requiring preparation of a National List of Endangered Species, however at this time it is not yet completed. Since a National List does not exist, the IUCN database was searched for threatened or endangered (T&E) species in Afghanistan. T&E species in Afghanistan are listed in Appendix A. BirdLife International (BLI) identifies habitats of special interest for avian communities. The BLI database was searched for habitats of special interest. These areas are listed in Appendix B.

The proposed project area has a very limited value as a habitat for any T&E species because of the lack of vegetative cover or other suitable habitat. The area around the proposed project area is currently developed as a road, and is frequently disturbed by human activity.

Several protected natural areas have been established in the country since the 1960s (Table 4.1), however, they have not been managed properly for decades and are mostly being degraded. All of these natural protected areas are located a far distance from the proposed road and will not be affected by the proposed project. No threatened or endangered species are known to exist within the direct footprint of the proposed project, and there are no protected areas within the project site.

#### 4.1.7.4 Wetlands

According to Wetlands International there are five important areas of wetland resources (Wetland International 2007) in Afghanistan. None of these are located within the proposed project area.

**Table 4-1 Official natural protected areas of Afghanistan**

| Name              | Area, (Ha) | Year | Elevation, m | Designation         | IUCN Category |
|-------------------|------------|------|--------------|---------------------|---------------|
| Dashte Nawar      | 7500       | 1977 | 3200-3210    | Waterfowl sanctuary | IV            |
| Pamir-i-Buzurg    | 67938      | 1978 | 3250-6103    | Wildlife reserve    | IV            |
| Ab-i-estada       | 27000      | 1977 | 1950-2100    | Waterfowl sanctuary | IV            |
| Ajar-valley       | 40000      | 1978 | 2000-3800    | Wildlife reserve    | IV            |
| Bande-amir        | 41000      | 1973 | 2900-2832    | Waterfowl sanctuary | II            |
| Kole Hashmat Khan | 191        | 1973 | 1792-1794    | Wildlife reserve    | IV            |

Source ADB 2002. "Afghanistan's Environment in Transition" (Data from the World Conservation Monitoring Center, IUCN. Gland, Switzerland and Cambridge, UK)

#### 4.1.8 Noise

Ambient noise levels in the project area are relatively low. Field investigations did not reveal the presence of "sensitive receptors", i.e., recipients of sound for whom exposures to excessive sound levels are detrimental – hospitals for example – in the project area.

#### 4.1.9 Other Environmental Concerns Noted by 22 CFR Part 216

##### 4.1.9.1 Historic and Cultural Resources

Afghanistan is home to many historical and cultural resources of the past four thousand years. Such resources include but are not limited to monuments, structures, works of art, and the sites of outstanding universal value from historical,

aesthetic, scientific ethnological and/or anthropological points of view, including unrecorded graveyards and burial sites. The responsibility for preservation, maintenance and assessment of historical and cultural monuments in Afghanistan rests with the Archaeological Committee under the Ministry of Information and Culture (MOIC).

A complete archaeological investigation has not been completed for the area of the proposed project. Thus, there is no known inventory of all cultural and historic resources in the area.

#### **4.1.9.2 Socio-Economic Considerations**

Economic considerations in Afghanistan have been overshadowed by political and military upheavals during three decades of war. Gross domestic product fell substantially because of the loss of labor and capital and the disruption of trade and transport. Severe drought added to the nation's difficulties between 1998 and 2005. The majority of the population continues to suffer from insufficient food, clothing, housing, and medical care, problems exacerbated by military operations and political uncertainties. Inflation also remains a serious problem. Following the defeat of the Taliban in November 2001 and the formulation of the Afghan Interim Authority (AIA) resulting from the December 2001 Bonn Agreement, international efforts to rebuild Afghanistan were addressed at the Tokyo Donors Conference for Afghan Reconstruction in January 2002. These efforts resulted in the creation of a trust fund to be administered by the World Bank. Priority areas for reconstruction include the construction of education, health, and sanitation facilities; enhancement of administrative capacity; the development of the agricultural sector; and the rebuilding of road, energy, and telecommunication links.

The Shinwar to Dur Baba road is located on the border of Pakistan and is considered a strategic bi-national trade route. Rehabilitation of the existing road has the potential to support a major expansion in cross-border trade and commerce, and may significantly benefit the local population through targeted community outreach activities that facilitate the movement of goods and people in the area. Currently, the road is used to transport imports from Pakistan, but the volume of exports from Afghanistan to Pakistan remains minimal owing to the problems in transport (largely due to mountainous terrain and lack of roads), coupled with an underdeveloped agricultural sector and limited investment in the private sector.

The proposed road alignment runs through a total of 13 villages. The villages located near the ROW in Shinwar District are Anar Bagh, Bahraman, Meer Kalay, Ameen Khan Kalay, Lookhy and Katelay. The villages located in the Dur Baba district are Gagirisar, Sholgar, Lakari, Marzeena, Haider Kalay, Wacha Lagara and Shagay. The majority of the population belongs to the Anar Bagh, Shitaki and Siya Chop tribes. These main tribes are divided into 11 sub-tribes. Most of the villages only consist of a few houses surrounded by agricultural lands. Houses are mainly constructed using clay bricks covered with clay mortar.

The road begins in the Ghani Khel bazaar at the starting point of the road is the major bazaar serving all 13 villages along the Shinwar to Dur Baba road. The other major bazaars are in Jalalabad city located 45 km southeast of proposed project site and the Perah bazaar which is located 15-20 km from the endpoint of the road

across the border of Pakistan. There is currently no road to Perah and goods are carried over the border via pack animals. The Dur Baba bazaar at the endpoint of the road is only for traders to facilitate cross-border transactions, and does not have many stalls for selling goods.

The Socio-economics data on the area of the proposed road are based on a Rapid Assessment Survey undertaken by the IRD Community Outreach Team in April 2008.

*Economic Activities:* The populations along the ROW live in extreme poverty. Agricultural lands are found only within the section from Anar Bagh to Katelay. These lands are irrigated by traditional methods (karez). Common agricultural crops are vegetables, wheat, corn, and cotton. Many farm families also own cows, chickens and other livestock. The main source of income for the Dur Baba population comes from trade with Pakistan. Goods from Pakistan are normally delivered to the Dur Baba bazaar by pack animals. The main shopping and trade centre for the local population is the Ghani Khel bazaar located at the village of Shinwar. Because the existing road from Shinwar to the Pakistan border is in such poor condition, most goods from Pakistan are brought in by pack animals.

*Infrastructure:* The formal infrastructure sector in Afghanistan is largely state owned and operated through centralized ministries with some operational and production functions delegated to government enterprises. In the urban water supply and sanitation sectors there is reported to be substantial private participation in service deliveries mainly through communities, non-governmental agencies (NGO) and UN agencies (World Bank 2002). In rural areas NGOs and communities have been and are likely to remain the core providers of infrastructure. In Nangarhar Province NGOs provide services in rehabilitation of irrigation, water supply, education and technical advances and inputs to the farmers.

*Education:* The formal education opportunities in the area of the proposed project are provided by three primary schools in the villages Ghanikhel, Amerkhan and Katelau. All of these schools are mixed and accommodate a total of 2670 students made up of 1959 boys and 711 girls. There are no secondary or high schools in the villages in the vicinity of project ROW. What secondary schools there are not adequate and experience a lack of trained teachers, lesson material and even classrooms for students.

*Health Care:* The health care facilities are not advanced in the area of the proposed road. There is only one hospital located in Ghanikhel 4 km from the village of Shinwar. Access to health care facilities is almost nonexistent due to the poor road conditions. The infant mortality rate is very high.

*Other Facilities:* No central power or water supply is available within the proposed project area. Construction of power and water networks in this region would significantly strengthen socio - economic ties with surrounding areas.

## 4.2 Stakeholder's consultations

All phases of the proposed project involve a continuous stakeholder consultation process and other community support activities undertaken by the SPR-SEA Community Outreach and Capacity Building (COCB) Program.

The stakeholders for this project include but not limited by:

- 1) Governmental Authorities - Governmental Authorities – Initial meetings with local government officials and community leaders took place on 8 April – 21 April 2008. During the rapid assessment, the Community Outreach field team met with key local community leaders, Shura members, and local and regional government officials along the road alignment and in Nangarhar province to secure their active support for the road project. The team also established positive relations with the District Administrator and Chief of Security in Dur Baba. In preparation for construction, the locally-recruited Community Outreach field team is prepared to work with construction managers, engineers and local subcontractors to identify and recruit local construction workers directly from communities along the road alignment. Labor identification will be undertaken through close consultation with respected community groups in the area.
  - Despite Dur Baba being located on the border with Pakistan, security is good due to the strict control of the tribal jirga through a local “taroon”, or treaty.
  - During the rapid assessment, the shuras overseeing the Dur Baba area pledged strong support for the SPR-SEA project.
  - Residents of the area are ready to recommend local security to be hired by the contractor.
- 2) Non-governmental Organizations - There are few development assistance activities in the area and the local residents fully support the SPR-SEA project.
- 3) Afghan associations, cooperatives and economic/community groups
  - The economy in Anar Bagh village in Shinwar is based mostly on agriculture. The main crops produced are wheat, corn, cotton, fruits and vegetables. These crops are consumed mostly on a subsistence basis or with very little sold in the Ghanikhel bazaar. There is also livestock in the area.
  - Ghanikhel bazaar in Anar Bagh serves all 13 villages within the project area. The bazaar offers the following types of stores: pharmacies, clothing stores, construction stores, petrol stations and fresh produce shops. All dried foods and consumer goods are of Pakistani origin.
  - Aside from the Ghanikhel bazaar, inhabitants of the area may travel 45 km northwest to Jalalabad City or travel 15-20 km east to Perah bazaar in Pakistan.
  - Previously, farmers in Shinwar cultivated poppy, but this is now strictly forbidden and enforced by law.
  - Residents of Dur Baba are traders and the Dur Baba bazaar is a central bartering location complete with a hotel for merchants traveling

from Pakistan. Most of the goods being bartered include tires and car parts, electric items such as freezers and food items.

- Dur Baba is located in a mountainous area and previously had a thriving mining industry. Iron and marble were the primary materials mined however, the government now forbids exploration.
- Private taxis make up the primary public transportation system however most local consider use of the taxis as too costly.

#### 4) Women, youth and children

- Women in Shinwar and Dur Baba districts are unable to move freely outside their homes and area. They are deprived of an education, health facilities and employment opportunities.
- There is a Women's Department located 10 km north of Ghanikhel and one women's CDC in Anar Bagh, but both groups are completely inactive for fear of their personal security and reprisals.
- According to the Community Outreach team, women who participate openly in female associations are considered a disgrace to their families.
- Despite the conservative viewpoints of the communities, vocational training has been identified as a priority for women in Shinwar & Dur Baba.
- Health Net International has trained a few women to be mid-wives, but there are no other reported activities for women in the project area.
- The IRD Community Outreach Gender Specialist will work closely with the field teams to determine an appropriate methodology for outreach activities inclusive of women residing in the project area.

These activities are included in the CY 2008 Annual Plan and flexible in approach, but consistent in data collection, analysis, monitoring and evaluation. In order to address this issue the COCB team recruited and mobilized a local team and conducted rapid assessment survey and macro-based data collection. The environmental issues were also discussed and integrated into the Road #5 Rapid Assessment Survey Document . The meetings with stakeholders were conducted during all field trips (Figure 4.4). Stakeholder consultations will continue throughout the period of road construction and after project completion during the one-year maintenance period.



**Figure 4-2 Discussion with the locals about the change of alignment**

## **SECTION 5 ENVIRONMENTAL CONSEQUENCES**

### **5.1 Direct and indirect impacts**

This section describes the possible effects of the proposed project on the resources including the potentially significant direct and indirect environmental and social impacts that may occur as a result of construction activities. Direct impacts are those impacts that result directly from the proposed project itself. These may include but are limited to local land use changes; impacts to soils; temporary construction impacts (e.g., noise, air quality); hazardous, toxic, and radioactive waste (HTRW) impacts; borrow pits impacts. Indirect impacts are those resulting from activities prompted by the proposed project, but not directly attributable to it. These may include changes to the local economy and security of villages along the right of way (ROW).

The impacts are analyzed both for the proposed project and the no-action alternative.

The impacts occurring as a result of the construction activities are discussed in the environmental sectors as follows:

- Air Pollution and Dust
- Geology and Seismic Risk
- Hydrological Impacts
- Disruption of Utilities
- Erosion and Sedimentation
- Water Quality
- Wetlands
- Natural/Biological Resources
- Hazardous and Solid Waste Management
- Noise and Vibration
- Sensitive Habitat and Protected Areas
- Impact to Agriculture and Loss of Production Areas
- Cultural Resources
- Employment
- Safety

### **5.1.1 Air Pollution and Dust**

Air pollution is a significant issue as good quality air is a necessary condition for environmental and human health. In the USA, air quality is regulated under the Clean Air Act of 1963, as amended. The U.S. Environmental Protection Agency (EPA) is required by the Clean Air Act to set NAAQS (40 CFR part 50), which establishes air quality standards for six principle pollutants (ozone, particulate matter, carbon monoxide, sulfur dioxide, nitrogen oxides, and lead). The detailed provisions and standards for air quality are not yet developed in Afghanistan.

#### Future without project

The existing gravel road without maintenance will remain a source of intense dust generation.

#### Future with project

Significant levels of air pollution are only anticipated in the event that large volumes of construction traffic or machinery operate continuously in close vicinity to sensitive areas. Site conditions are such that dust is unlikely to be blown long distances, and will settle quickly, resulting in only localized zones of impact. Significant impacts will occur therefore only if stationary point sources such as stockpiles, crushing, and concrete batching are located adjacent to sensitive sites. Particulates generated by project construction would only be temporary and cease after the construction is completed. These effects should be minor in nature and should not affect overall health of the local communities. The subcontractor will provide watering trucks to perform dust mitigation during the course of the project.

Long-term prospects are the road could accelerate development and a certain worsening of air quality may occur because of the increase in traffic and potential new industries that may appear. However, it is anticipated that the completion of the proposed road will considerably improve the air quality in the area due to a reduction of dust generation and more efficient use of fuel due to the better road quality. The existing relatively high air quality of the project area, together with the relatively low volume of traffic expected on the road section suggest that vehicle emissions will not be a significant issue in the foreseeable future.

### **5.1.2 Geology and Seismic Risk**

Geological structure of the area and seismic conditions can considerably affect safety and life conditions. Improper interference with natural geological process can cause or accelerate natural disasters. Geological resources are very important for development therefore; this issue is of high significance.

#### Future without project

Without implementation of the proposed action, the geology and geomorphology of the area will continue to be impacted by erosion processes accelerated by the poor condition of existent road. The limited capacity of existent road will hinder development of the potentially rich mineral resources of Nangarhar Province.

### Future with proposed project

Geological resources could be affected due to project-induced demand for resources such as rock, sand, and other building materials. Specific sources used for road upgrading materials will depend upon the location of the segment of road being upgraded. Rock materials will be obtained from local sources and hauled by road to the segment being upgraded as needed. Subcontractor developed gravel sources are expected to be used in most cases, although subcontractors may elect to use other supply options provided they are cost competitive and adhere to established quality standards. There are a range of resources that will be required for the construction of the road and drainage structures.

- Rock and aggregates: Rock and aggregates of sufficient quality are locally available near the project. In the case where finer aggregates are not readily available, they will need to be manufactured (crushed) from coarse aggregates. While there is no shortage of suitable rock, the gaining and processing of the rock to design standards may incur potentially significant noise, dust, and water pollution impacts that may require management.
- Cement: It is understood that cement will be imported to the region and transported to the site in bulk by heavy vehicles. Therefore, impacts would mostly be associated with transportation. Steel and timber; and other components will also be imported to the site from outside the region.
- Water: It is expected that the subcontractor shall obtain water supplies from underground wells drilled for construction needs. It is considered unlikely that rates of uptake will affect existing groundwater resources. The subcontractor will need to ensure that no adverse impacts are imposed on local village water supplies or other water users.

The seismic and geological characteristics of the potentially affected area have been taken into account during design. The subcontractor shall select and use proper sources of material for the proposed project. The places for borrow pits and other sources of material must be reviewed and approved by IRD personnel. Due to the abundance of construction material sources in the area, the project induced demand is unlikely to cause or contribute significantly to their depletion. There are not any anticipated adverse impacts from the proposed project to geological resources or landscapes. The proper implementation of the seismic considerations into design and construction will reduce to a minimum any adverse effects of future earthquakes on the road structures.

### **5.1.3 Hydrology**

Sustainability of the natural hydrological network is very important for supporting the natural environment, erosion control and sustainable development.

### Future without project

The hydrology within the proposed ROW will remain the same. Unregulated seasonal streams and poorly designed irrigation channels with a lack of adequate

drainage structures to accommodate the water flows crossing the road alignment will continue washing out the existing road and increase the potential for erosion.

#### Future with proposed project

Based on the hydraulic and hydrology (H&H) study, culverts, lined ditches, and causeways will be constructed as part of the project. Technical investigations during construction may alter quantities of such structures determined at the current design stage to better match existing field conditions.

Watercourse crossing structures such as culverts are used wherever required in the ROW. Hydrological integrity of the watercourses cannot be guaranteed, but water crossings will be significantly improved by the project. Washouts will be reduced or eliminated with construction of the proposed project because water will be directed across the road through engineered structures. In addition, elevated roadway and the highly compacted, engineered aggregate surface material will resist water erosion during times of great water flow.

Because the in-situ soils in the proposed project area are generally fine (Section 5.1.6 Water Quality), bank stabilization structures are required to control erosion at water crossings and collection areas. The design contains numerous examples of stone masonry walls and stoned lined embankments to prevent erosion and preserve the road structure in cut-and-fill areas.

Runoff is not thought to currently be a significant problem because the existing road is porous and rainfall intensity is low as this is an arid to semi-arid area. Runoff is expected to increase because the improved aggregate road surface materials will not be porous and the new surface is designed to shed water. This fact is accounted for in the project hydraulic study and subsequent design (culverts and causeways) of the road.

During construction, grey and black-water will be contained and removed from the site in an approved manner. The road will alter the catchment conditions, specifically the amount, rate, and discharge point of storm water runoff. However, changes to catchment hydrology are not anticipated to be significant. Upon construction, the new drainage structures will considerably improve the existing hydrological network.

#### **5.1.4 Disruption of Utilities**

The state of infrastructure is a very important indicator of development and quality of life. The creation of modern infrastructure is one of the most important priorities for developing countries and therefore an issue of high significance.

#### Future without project

Water supply and irrigation will remain the same. The gradual worsening quality of the existing road and bridge will negatively affect the quality and cost of goods and services transported along the existing road.

#### Future with project

It is apparent from the design that a number of structures and other community assets will be affected by the project including property walls and fruit trees. Discussions with communities have indicated that the displacement of structures within the communities should not be an issue of concern, provided that the structures will be restored. The loss of fruit trees and bushes may be of greater concern due to their economic and food value. Any trees that must be removed will be replaced in kind.

The proposed project will have a beneficial impact on the water supply of the area. As part of the COCB program, five new community water wells will be constructed by the subcontractor and left for the community to use when the project is complete. The outreach program is an integral part of the SPR-SEA project. It includes also construction of a first aid station nearby the ROW. The proposed project will not impact other infrastructure systems such as wastewater collection networks, electrical lines, etc. because these facilities have not yet been developed within the ROW. As a part of project at least 4 wells will be constructed and passed on for the community needs that will considerably improve local water-supply network. With the expected growth of the economy, the infrastructure needs of villages along the ROW may change and future additions are very possible.

### **5.1.5 Erosion and Sedimentation**

Stability of soil is very important for erosion control, air quality and agricultural activities especially in an area with widespread erosion processes.

#### Future without project

Loose soils on the existing road will continue to experience wind and water erosion.

#### Future with proposed project

Potential impacts to soils include those pertaining to borrow sources, erosion, HTRW contamination, and soils important to agricultural production.

Increased embankment heights and wider roadways may present demands for fill, portions of which are likely to be supplied by borrow sources in the area. Significant losses due to borrow pit excavations will be avoided through mitigation actions, as discussed in Section 6.4.1 Mitigation Measures for Direct, Indirect, and Induced Impacts.

The proposed project may result in increased runoff that could lead to soil loss. All construction activities will be confined to the existing ROW and a small increase in the volume of runoff is anticipated. This change is accounted for and mitigated in the hydraulic and hydrological design for the project.

During construction there are a number of potential sources of erosion and sedimentation in addition to those resulting from initial site clearance and operations on unprotected surfaces. These include soil, aggregate and other materials stockpiles. Particular issues associated with these include:

- Instability of spoil stockpile slopes and slumping risk;

- Slope overloading and resultant failure;
- Sedimentation problems;
- Alteration of drainage patterns;

During construction, trucks and heavy equipment may disturb the topsoil which could pose dust problems for the workers and nearby residents. The proposed project borders farmland, which may be threatened by urbanization, and desertification. Desertification is a major issue in Afghanistan, according to the United Nations Environment Program (UNEP). UNEP has made recommendations on management of water resources and reforestation to reduce vegetation loss and prevent further desertification (UN 2007). As mentioned in Section 5.1.4, Disruption of Utilities, any trees removed as part of the construction of the road will be replaced. Under the grant mechanism of the SPR-SEA program, additional trees may be planted as part of the business development along the road such as a nursery or fruit tree farm to provide additional food for the communities or as a commercial product for sale to other communities. With care taken for sediment and erosion control, topsoil should be minimally affected. It is anticipated that the proposed project construction would have mainly positive impacts to the soils at this site due to improved erosion control and mitigation measures.

#### **5.1.6 Water Quality**

Water quality is technically significant because of the need for good water quality by aquatic and terrestrial organisms. It is publicly significant because of the desire of virtually all citizens for good water quality.

##### Future without project

It is expected that ambient water quality will remain the same.

##### Future with proposed project

In the short-term, construction of the proposed project may temporarily affect water quality. The primary probable types and sources affecting water quality are:

- Fuel and oil spills from vehicles, storage tanks, and machinery;
- Suspended sediment from earthworks in catchments of water courses;
- Wash-waters from rock crushing plant;
- Human wastes from construction camps, and indiscriminate sanitation practices;
- Indiscriminate dumping of domestic and construction wastes;
- Wash-waters containing oil or detergents from cleaning equipment

In order to preserve water quality at the project site, borrow material, sanitary waste, industrial waste, and other associated construction waste materials shall not be disposed of in any water body. Provisions for the control of hazardous materials and actions to be taken in the event of accidental spills have been incorporated into the contract documents through subcontractor environmental management plans. It is unlikely that contamination due to spills or hazardous materials will occur during construction of the proposed project. The proposed project will affect existing water quality to the minimum extent practicable. It is anticipated that upon completion of the proposed project the overall water quality in the area will be improved due to new water supply wells and improved drainage structures.

### **5.1.7 Wetlands**

Wetlands are environmentally important because they provide necessary habitat for various species of plants, fish, and wildlife; serve as ground water recharge areas; provide storage areas for storm and flood waters; serve as natural water filtration areas; provide protection from wave action, erosion, and storm damage; and provide various consumptive and non-consumptive recreational opportunities. Wetlands are publicly important because of the high value the public places on the functions and values that wetlands provide.

#### Future without project

There are no significant wetlands in the project area.

#### Future with proposed project

There are no wetlands located in the project area, therefore no impact is anticipated

### **5.1.8 Hazardous, Toxic, Radioactive and Solid Waste Disposal**

The subcontractor is obligated to assume responsibility for the reasonable identification and evaluation of all HTRW contamination within the vicinity of the proposed action.

#### Future without project

HTRW contamination will not occur if the proposed project is not constructed.

#### Future with proposed project

The project is not expected to generate hazardous waste. If HTRW resources are generated or found they are required to be properly managed in accordance with internationally acceptable Hazardous Material Management Procedures. These include identifying, labeling, keeping data sheets for HTRW along with enforcing safe storage and work practices to handle hazardous material. There are no adverse impacts from HTRW anticipated during construction and after completion of this project in the reasonably foreseeable future.

Solid waste: Potential sources of solid waste can include: cleared vegetation; excess cut; general construction wastes; domestic wastes from the construction camps; and rock from blasting.

This issue is not anticipated to be significant in short-term prospects; however the volume sources and nature of solid waste to be considered may increase with future development of the area.

Unexploded ordinance (UXO): Any UXO in the area poses a risk to workers and equipment if it is not properly identified and removed from the site. The existing gravel road was recently demined. If UXO is found on the site during the survey or construction, it is required to be properly disposed of by UNMACA approved technicians. The Level 1 Demining/UXO report from UNMACA and the Regional AMAC indicated that no demining will be required for this road project.

### **5.1.9 Natural/Biological Resources**

This issue is very significant as Afghanistan's unique biodiversity has been depleting very quickly during the last decades. In addition, populations depend heavily on natural biological resources.

#### **5.1.9.1 Flora**

##### Future without project

If the no action alternative is pursued, no impacts will occur to the existing flora.

##### Future with proposed project

Construction activities will impact only the narrow band of vegetation adjacent to the existing roadway. Implementation of the proposed action would result in impacts to the vegetation in the construction ROW. Most of the vegetation impacted will be grass, shrub, or scrub. Small areas of riverside vegetation, including a group of trees will be removed for construction of the new bridge. Impact to roadside fruit trees will be avoided or minimized. Plants could also be affected by the improper locations of roadside activities such as construction camps and other ancillary features. Impacts to plant life during construction will be mitigated through the appropriate construction supervision activities to ensure that ancillary features are properly sited. The improved access road could facilitate timbering of the remaining mountain forest near the Dur Baba. However, this important resource can be preserved by the inter-tribal agreements as the road also provides the better conditions for control. Other impacts of road projects have included importation of new plant species upsetting the existing equilibrium as native species face competition for resources from new arrivals. Care should be taken by all project personnel to avoid introducing new plant species to the area. It is anticipated that the proposed road will improve the vegetation cover in the project area as a replanting program is a part of the proposed outreach activities for this project.

#### **5.1.9.2 Fauna**

Wildlife resources are technically important because they are a critical element of

many valuable aquatic and terrestrial habitats; are an indicator of the health of various aquatic and terrestrial habitats; and many species provide important commercial resources to the community. Wildlife resources are publicly important because of the high priority that the public places on their aesthetic, recreational, and commercial value.

Species of wildlife within the proposed ROW are not known. However, it can be extrapolated that species common within the region would be likely found within the proposed ROW (Section 4.1.7.2 Fauna). It is expected that wildlife migrate along and across the existing road.

#### Future without project

Wildlife in the area will continue to be in the same state along the existing ROW.

#### Future with proposed project

Consideration will be given to potential direct impact to wildlife due to habitat loss, fragmentation, disruption of wildlife migration patterns, and accidents involving wildlife. The fact that proposed construction actions would occur within areas already devoted to transport and the fact that all improvement activities would be contained within the existing ROW minimizes any potential for further habitat fragmentation. No evidence has come to light indicating that the existing ROW interrupts wildlife migration corridors in the vicinity of the proposed project area. The existing road corridor is already established as a transport corridor which does not increase the potential for wildlife accident impacts.

Indirect impact: While native fauna are mostly absent from the project area, there may be some remnant native fauna inhabiting the affected areas. Remnant fauna could be affected by the project in several ways. Improved access may bring more visitors to the area who may hunt the native species. Increased traffic may also increase the losses of native species as well as domestic cattle which roam freely. The transport of fuel and toxic chemicals could result in accidental spills also may threaten the remaining natural flora and fauna of the project area but only in areas immediately adjacent to the road. Wildlife populations that inhabit higher elevations and which do not feed on animals and plants at risk are unlikely to be affected. It is anticipated that construction within the ROW will not lead to any loss of native fauna.

#### **5.1.9.3 Sensitive Habitat and Protected Areas**

Species of special interest are classified as such by the International Union for Conservation of Nature and Natural Resources (IUCN). Habitats of special interest are classified by BirdLife International (BLI). Threatened and endangered species are technically significant because the status of such species provides an indication of the overall health of an ecosystem. Many nongovernmental environmental organizations and private citizens support preservation and enhancement of rare species and their habitats.

The IUCN database was searched for threatened and endangered species in Afghanistan. Threatened and endangered species in Afghanistan are listed in Appendix A. The BLI database was searched for habitats of special interest. These

areas are listed in Appendix B.

#### Future without project

No significant impacts to the existing biological resources and sensitive habitat or protected areas for threatened or endangered species are expected if the proposed project is not constructed.

#### Future with proposed project

Based on all available information, no populations of species or the habitat for any species that are endangered, critically threatened, threatened, or vulnerable as per the IUCN database will not be significantly impacted or stressed by the proposed project since none are known to exist in the project area.

### **5.1.10 Impact to Agriculture and Loss of Production**

Agricultural lands provide the provision or potential for provision of human and livestock food products for the region. They are publicly significant because of their present economic value or potential for future economic value.

#### Future without project

Farmland in the region will continue to be maintained and utilized. However, the worsening quality of road will increase the transportation costs and as a consequence decrease the efficiency of the land use.

#### Future with proposed project

The proposed ROW may require a limited acquisition of lands which are used currently for agriculture. Some agricultural lands may be disturbed by site clearance which will be required for all project works. This will include removal of boulders and rocks and in some cases vegetation, soils and surplus material.

Some temporary land take will be required for various purposes during the construction phase, such as for spoil heaps, stockpiles, construction yards, and construction camps. Wherever possible such sites should be located within defined rights of way on land already acquired for project purposes. However, it is inevitable that some land outside this limit will be required. The duration of the take will be variable depending on the required purpose but would in most cases be relatively short term.

In the long term, farm production may be affected by the stresses brought on by an increase in population (e.g., increase in wastes, effluent, air pollutants, etc.). An increase in population may also see the conversion of agricultural land into housing, shops, etc., as trade and security increases.

A long term benefit of the project is that it may facilitate increased access to markets and public services not previously available due to the poor route conditions. As population, trade, and security increase, agricultural areas may benefit economically from increased exposure and accessibility. The project may induce development of

populated areas, which may affect agricultural sustainability. It is anticipated that agriculture will become the main beneficiary of the proposed projects.

#### **5.1.11 Other Socio-Economic Considerations**

The improvement of the social-economic situation and living standards of people is the primary goal of this project. The lack of development and poverty levels are severe in Afghanistan. Therefore the analysis of socio-economical benefits of the proposed project is an issue of especially high significance.

##### Future without project

There will be no significant changes to the socio-economic situations of the villages; further development may be adversely affected by worsening quality of the road.

##### Future with proposed project

The proposed project is expected to have a beneficial impact on the economy of both the potentially affected areas and the country as a whole by accommodating traffic and enhancing trade within a major province and reducing the current travel time. The road construction will also facilitate the use of resources in proximity to the roadway. A road in this area may assist in keeping this border area secure.

The construction program may cause disruption to utilities and services currently used by the villages, namely:

- The maintenance of the water supply to all existing system users is a project requirement. However, there is some risk of short-term interference in supplies.
- Disruption of vehicle access may occur, both within and between villages, but any such event would be very short term and current levels of all types of traffic are so light that impacts should not be severe.

There is a requirement for a number of unskilled, semi-skilled and skilled workers during the construction of the road bringing welcomed employment opportunities to the communities. Not only would this provide some economic benefit to the communities but it will also incorporate local knowledge, skills and values into the construction program. Contracts with the local workforce will be also considered to perform routine maintenance operations during the maintenance period after road construction is completed.

*Introduction and Spread of Disease:* The transport of fruits, vegetables, and livestock to and from markets, and between villages, will be facilitated by the proposed road. This increased trafficking of agricultural goods has the potential to promote the introduction and spread of diseases, between villages, as well as to and from markets. This impact is exacerbated by the lack of veterinary and agronomy assistance and agro-chemicals currently available to the villages.

Road Kills: While livestock are more visible and more likely avoided during daylight hours, stray animals will not be easily seen at night. Vehicle impacts with animals may result in both animal and human casualties and vehicle damage.

Public Health and Safety: Construction sites are potentially dangerous, and serious accidents may occur, particularly if safety procedures are not implemented. The construction of the road will involve a number of activities that pose safety risks, such as, use of heavy machinery and construction traffic is a particular concern due to the remoteness of the construction site from hospital facilities at and the lack of communications between the site and medical facilities. Improved road conditions may increase vehicle circulation and speed, thereby creating potential for increasing accidents and deaths along the roadway.

Improved access to medical facilities: The main benefit of the provision of the road with regards public health is the improved access of the villages to health facilities.

Increased vulnerability to criminal activity: The improved access provided by the road may increase the activity of criminal elements in the area; however, the new road will also improve access for security forces.

It may be concluded from this discussion that potentially significant social-economic benefits of the proposed project include, but are not limited to:

- Reduced travel time
- Lower cost of transporting goods and passengers
- Facilitation of aid
- Access to markets
- New trade opportunities
- Employment
- Social contact
- Improved access to health facilities
- Improved access to Agricultural assistance
- Improved access to Education
- Improved security access

No significant negative socio-economics impact is anticipated from this project.

In addition to road construction the IRD Community Outreach Team has developed an extensive program to support agriculture, water-supply, health facilities, education and community awareness of construction site and road safety in the area to supplement the temporary immediate economic benefit of the road construction and provide long term economic opportunities.

### **5.1.12 Historic and Cultural Resources**

Cultural resources are technically significant because of their association or link to past events, to historically important persons and for their ability to yield important information about history. Cultural resources are publicly significant because preservation groups and private individuals value their historical merit and support their protection, restoration, enhancement, or recovery.

### Future without project

The sites will most likely not be preserved, as the MOIC does not currently have a program in place to document or preserve historical data in the area.

### Future with proposed project

Significant cultural and historical sites should not be affected by construction of the proposed project. The proposed ROW will avoid these sites (as well as others encountered by the subcontractor in the field), and ensure any adverse impacts to them do not occur.

Construction shall halt with the discovery of any and all possible undocumented cultural and historic sites. The potential resource should be evaluated by an archaeologist hired by IRD to determine significance. The proposed ROW may be changed in the field to avoid any adverse impact to resources deemed significant.

## **5.1.13 Noise and Vibration**

### Future without project

Noise levels will continue at present levels.

### Future with proposed project

The short term noise caused by construction of the road will result in significant generation of noise and ground borne vibration from the use of heavy equipment and general construction activities. These impacts will be temporary in nature and will be limited to daylight hours. After construction is completed the noise levels will return to the normal levels for the area.

Traffic on the newly constructed road will not generate any significant increase in noise levels. It is anticipated that there will be no significant long term effects from noise as a result of construction of the proposed project.

## **5.2 Cumulative impacts**

The EPA requires a Federal agency to consider not only the direct and indirect impacts of a proposed action, but also the cumulative impact of the action. A cumulative impact is defined as the “impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions” (40 CFR 1508.7). Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Induced development has the potential to have major cumulative impacts along the ROW. As discussed above, urbanization of the area may have impacts on land characteristics and use along the ROW. The proposed project would construct a more-dependable roadway for the transport of goods in the area, allowing for an increase in trade. Villages along the ROW may expand from the growth of local

economies, which would impact the agriculture and soils in their vicinity; farmland may be converted to urban development. Conversely, trade may promote an increase in farms, which would change the land use and hydrology (e.g., irrigation) of the area. It is difficult to predict in details all long-term cumulative impacts from the proposed road however; undoubtedly it will promote the sustainable development and strengthen the integrity of the country.

## **SECTION 6 COMPLIANCE PROCEDURES**

### **6.1 Introduction**

This section discusses major mitigation measures and the responsibilities of IRD regarding best management practices (BMP) to implement those measures. Implementation of mitigation measures will ensure compliance with USAID (22 CFR 216), IIR, and the USAID Asian Near East (ANE) Bureau Environmental Officer (ANE BEO) environmental standards and guidelines.

### **6.2 Authority and Regulatory Considerations**

22 CFR, Part 216 revised April 1, 2001 is the code which guides USAID's environmental procedures. The USAID Bureau Environmental Officer (USAID BEO) and ANE Bureau concurred with the recommendations contained in the Programmatic Initial Environmental Examination (PIEE) and 22 CFR Section 216(2)(d)(1)(xi). 22 CFR Sec. 216.6(a) states the following: "the purpose of an Environmental Assessment is to provide USAID and host country decision-makers with a full discussion of the significant environmental effects of a proposed action. An EA may include alternatives which would avoid or minimize adverse effects or enhance the quality of the environment so that the expected benefits of the objectives can be weighed against any adverse impacts upon the human environment." The PIEE recommendations require that USAID prepare and approve a Programmatic Scoping Statement and EA for each province project because the proposed project involves new construction and may have significant impacts on the environment.

### **6.3 EA Scoping Process**

The first step in the EA scoping process is the preparation of a Programmatic Scoping Statement, which is a document used to anticipate potentially significant issues, issues that are potentially not significant, and to determine how and by whom the study will be conducted. The Programmatic Scoping Statement was prepared for the all road projects under SPR-SEA that are generic or common to a class of agency actions in accordance with principles set forth in 22 CFR 216(d). The purpose of the Programmatic Scoping Statement is to set forth clear understanding among USAID and the Government of Afghanistan with respect to issues specific to this project. A Programmatic Scoping Statement was prepared to identify significant issues and to determine which issues are not considered significant with respect to impacts on human health and the natural and physical environment. The ANE BEO approved a Record of Decision for the Programmatic Scoping Statement 30, September 2008.

## 6.4 Recommendations for Development and Implementation of Mitigation Measures

### 6.4.1 Mitigation Measures for Direct, Indirect, and Induced Impacts

Less-than-significant adverse impacts may occur during the road rehabilitation activities such as short-term impacts to air quality, noise levels, water quality, soils, and the economy. These impacts will be mitigated by the contract provisions as specified herein, including actions such as water spraying to control dust and the restriction of noise-generating activities to daylight hours and the avoidance of such activities in sensitive areas. The subcontractor is obliged to submit Environmental Management plan as a part of submittal for the project implementations. The summary of recommended measures is provided in Tables 6.1 and 6.2. The specific recommendations for mitigation are discussed below.

*Air Pollution and Dust:* During construction all practical and reasonable methods and devices to control, prevent and otherwise minimize atmospheric emissions or the discharge of air contaminants will be utilized. All equipment and vehicles must be maintained to avoid excessive emissions of particulates due to poor engine adjustment or other inefficient operating conditions. During the works the subcontractor shall carry out reasonable and practical measures, wherever and as often as necessary, to prevent dust that has originated from his operations from damaging any natural habitats, affecting the health of any persons, or creating a traffic hazard in the vicinity of operations. All machinery and vehicles must be maintained and operated in manner to minimize fugitive dust emissions. This specifically applies to quarries, rock crushing and screening plants. Construction site access roads shall be maintained in such a way as to minimize fugitive dust emissions. Water shall be lightly sprayed on exposed ground during dry and windy periods, or as necessary. Speed restrictions shall be enforced for all vehicles, including construction vehicles. Stockpiles and earthworks will be covered or sprayed with water during dry and windy periods to minimize fugitive dust emissions. In addition, there will be effective control of fugitive dust during delivery of materials and collection of waste.

*Agricultural lands:* It is necessary to avoid damage of any crops, pastures, orchards and any other products where possible. Barren areas or areas of low productivity value shall be used for borrow pits, stock-piles and other construction related purposes. Local villagers shall be asked to identify the most appropriate sites for temporary land use for storage of materials and equipment, etc.

*Hydrology and water quality:* Water use should be agreed on with the local communities. Care should be taken not to interfere with the local water supply. Where interference with local supply is unavoidable, consultation with affected parties and communities should be undertaken to ensure their needs and requirements, with regard to water supply, are met and to prevent significant detrimental effects impacting the resource. The discharge of any matter into any waters shall be avoided. Necessary measures shall be implemented in order to avoid water contamination during transportation, transfer and storage of fuel. Fuel transport, storage and handling shall be in accordance with Afghanistan or international standards. Fuel storage tanks shall be located away from rivers and

streams. Re-fuelling operations shall take place away from streams and watercourses.

Construction activities carried out in the stream flow or catchments of drinking water sources shall consider to the following mitigation measures:

- Informing the affected population that works will be carried out, and that water quality may be affected;
- Taking all possible steps to prevent the entrance of pollutants into the drinking water source;
- Terminating the water supply at the collection point at times when pollution is inevitable, to prevent consumption of polluted water.

***Road Safety:*** As indicated in Section 5.1.11 traffic accidents may have major social and economic consequences for affected families and communities. All practical measures shall be taken to minimize loss of life and injury from road traffic accidents. In order to minimize safety risk to the employees and public during construction, a trained first aid staff will be employed and equipment operators will be trained on the safe operation, maintenance and storage of equipment. Masks and protective clothing shall be issued to the workforce in all areas where fugitive emissions are potentially significant and emergency vehicles shall be provided for the project to evacuate any injured personnel. The proper temporary road signs and markings will be employed when required, e.g. during road diversions.

In long term prospect proposed measures may include:

- Speed control and traffic calming, such as speed bumps, through villages;
- Speed control and signage, railings and other traffic control measures at dangerous sections of roads, e.g. bends, bridges etc.
- Safety barriers and shoulder widening in some sections.

On unlit roads livestock represent an additional hazard to road users. They are also a significant economic asset to their owners and communities. Therefore measures are required to minimize casualties of domestic (and native) animals caused by vehicles traveling on the road. These measures include:

- Proposed speed limitations in areas where animals graze;
- Caution signs for livestock crossings;

***Disruption to Utilities:*** If during construction it is necessary to disrupt irrigation water, any disruptions shall be short term only, and infrequent. The contractor shall notify local communities about the disruption in advance. Any sustainable improvements in the existing supply should be left as a permanent improvement in the supply, e.g. pipelines under roads and to houses. If interruption of access to a water source is necessary, an alternate access or source shall be provided.

*Erosion and Sedimentation:* In areas where productive lands may be directly or indirectly threatened by construction activities, the subcontractor shall implement erosion protection measures, particularly on vulnerable soils, as soon as is practically possible following disturbance of the earth. Permanent slope stabilization shall be implemented as soon as possible, following cuts of slopes and embankments. Where temporary stream diversions for the construction of new culverts are required they shall be carried out so that no additional erosion takes place. Any damage occurring as a result of erosion and sedimentation that is related to the construction of the project shall be repaired as soon as possible. Any damage to existing vegetation, particularly in steep areas, or on vulnerable soils shall be minimized. Stockpiles of soft materials shall be built and maintained to prevent erosion during heavy rains. This may include covering, constructing low slopes on the sides of the stockpiles, and compacting the surface of the stockpiles.

*Conservation of Habitats:* It is recommended to minimize, where practicable, the overall impact from clearing vegetation for construction by avoiding all vegetated areas and implementing remedial measures including replanting of native or food producing plants following completion of all construction works. Native species should be used where possible for bio-engineering slope protection measures, as this would ensure their ongoing survival, and avoid the potential problems of introduced species. Where possible, clearing of vegetation shall take place following the harvest season. Where possible, productive plants are to be removed and replanted. All trees and shrub cuttings should be agreed upon with local communities.

*Noise and Vibration:* All construction activities should be limited by day time. Construction machinery shall be fitted with muffling, and other noise control devices. It is similarly expected that all machinery will be maintained to ensure that there is minimal noise generation under normal operation. In order to prevent excessive noise, all machinery that is not in use shall be shut down or throttled down. Construction personnel will wear hearing protection on site when noise levels exceed 85 A-weighted decibels (dbA).

*Solid Waste Management:* Disposal or storage of solid waste materials is not permitted in or close to the villages and residential areas, cemeteries, river/stream beds, cultivated lands, pastures, native fauna, including trees, shrubs and grasslands. Inert natural materials (e.g. soil, rocks) may be disposed of in the project area. In such cases the materials disposed of should match the existing material, and should not cause any adverse environmental impacts. Reactive or hazardous materials shall be disposed of in accordance with Afghanistan's and international standards.

*Management of Social Impacts:* Subcontractor shall undertake all necessary measures for preventions of adverse social impacts through discussions and consultations with stakeholders. It is recommended to reach informal agreements with communities and the authorities prior to the initiation of construction. These agreements will be intended to maximize potential project benefits and also to limit the potential for existing and potential social stresses to hinder project implementation and delay completion. It must be recognized that such agreements are unlikely to be considered binding by communities in the event of a dispute. The

primary purpose of the agreements is to minimize the potential for disputes by making all parties aware of the project development process and issues that may arise in meeting the differing needs of the community. The social conditions of the villages should be also be monitored at the operational phase. Given the low population this can be achieved by visiting the villages and interviewing the village leaders and elders about the change in social conditions.

**Table 6-1 Direct Impact Mitigation Measures**

| Type        | Impact Source                                      | Mitigation Measure  |
|-------------|--|---|
| Air Quality | Material Transport                                 | Rock, sand and other dust producing material will be sprayed prior to transport..   |
|             | Earthwork Activities                               | Subcontractor is required to spray roadways with water to minimize dust in dry conditions.  |
| Noise       | Earth Moving                                       | Limit earth-moving schedules. Use of low-noise emission vehicles. Proper maintenance of equipment. Use of noise barriers where warranted.   |
|             | Construction                                       | Minimize high noise levels, vibrations and time of occurrence.  |
| Hydrology   | Uncontrolled Runoff During Construction Activities | Runoff during construction will be strictly controlled as a part of construction supervision activities by using organic material, earthen berms, or other appropriate measures. Monitoring will be undertaken as a routine part of construction supervision  |
|             | Disruption of Irrigation                           | Irrigation systems have been taken into account in design. Alternative water sources will be developed as warranted due to temporary interruptions.   |
|             | Effects of Construction Camps & Staging Areas      | To avoid inappropriate wastewater disposal and runoff, provisions for their location and standards for their design are established by the construction documents.  |
| Soils       | Loss of Agricultural Land                          | Loss of agricultural land has been avoided as much as possible. Use of corridors already dedicated to agricultural use minimizes the need to destroy additional agricultural land. All fill material will be obtained from nonagricultural areas.   |
|             | Inadequate Slope Stabilization                     | Side slopes standards have been established to reduce erosion potential and/or, if necessary, stabilized, covered with rip-rap or other material to prevent soil erosion. Where appropriate, embankment slopes and road cuts will be stabilized by re-vegetation with resistant plant species, placement of fiber mats, rip-rap, rock gabions, or other appropriate technologies. |
|             | Soil Loss Due to                                   | Discharge zones from drainage structures will   |

| Type           | Impact Source   | Mitigation Measure   |
|----------------|---|--|
|                | Water-Related Erosion                                 | be furnished with rip-rap when warranted. Low water crossings will be lined with rip-rap/masonry or concrete to prevent erosion. |
|                | Uncontrolled runoff from construction and labor camps | Runoff will be controlled by strategic siting of construction and staging areas.   |
| Socio-Economic | Disruption of Economic Activities                     | Contractors are required to minimize disruption due to traffic detours and construction activities.                              |
|                | Traffic and Transport Disruption                      | Avoid social tensions and the opportunity cost of time lost due to traffic delays by use of public information programs.         |

**Table 6-2 Indirect Impact Mitigation Measures**

| Type                 | Impact Source                            | Mitigation Measure   |
|----------------------|--|--|
| Geological Resources | Project-induced demand for rock and fill | Construction materials will be purchased from appropriate sites. |

The predominant operational issues concern road maintenance, accidents (spills of hazardous chemicals / fuel) and road safety. The potential for significant impacts upon air quality and noise are considered to be low due to the low traffic volume anticipated on the road.

Along with economic growth an increase in population would likely accompany an increase for potential HTRW contamination, as potentially more toxic materials would be used by a larger population. An increase in the variety and number of institutions that make up the infrastructure of the region is also probable. The road may also serve an important role for US-led coalition forces in its fight against terrorist groups along the Pakistan border.

All applicable environmental statutes either have been or will be complied with prior to project commencement. USAID/Kabul determined the proposed project to be consistent to the maximum extent practicable with USAID and the Government of Afghanistan statutes and law.

## **SECTION 7 CONCLUSION**

The purpose of this project is to reconstruct/rehabilitate an existing gravel road from Shirwar to Dar Bubal linking the centers of these districts. The proposed project will improve the transportation network in the Nangarhar Province. USAID is proposing reconstruction/rehabilitation of roads such as the proposed project in the southern and eastern provinces of Afghanistan that link province and district centers. The road may also serve an important role for US-led coalition forces in its fight against terrorist groups along the Pakistan border.

The proposed project was coordinated with USAID, the Government of Afghanistan, and PRTs. Afghan, US, and local agencies, as well as other interested parties, will receive a copy of this EA and the Finding of No Significant Impact (FONSI).

Pursuant to 22CFR 216.3(a)(9), if new information becomes available which indicates that activities to be funded by the project might be “major” and the project’s effects “significant”, this determination will be reviewed and revised by the ANE BEO and, if appropriate, an environmental assessment will be prepared for the significant issues.

It is also anticipated that additional inspections will be required in response to complaints by local communities. In general terms it is expected that these will be confined to dust and noise nuisance but capacity may be required for other assessments. An additional two visits per quarter by IRD staff may be required.

The proposed project has been evaluated for its effects on significant resources including agriculture, air quality, geology, hydrology, infrastructure, soils, water quality, wetlands, hazardous waste, vegetation, wildlife, cultural resources, socioeconomic impacts, and noise. Adverse impacts to agriculture, air quality, geology, hydrology, infrastructure, soils, water quality, wetlands, hazardous waste, vegetation, wildlife, cultural resources, and noise will be minimized or avoided where possible. The potential construction impacts would be temporary in nature. Additional environmental issues have the potential to arise with the disposal of construction debris, noise levels; air quality due to the use of heavy equipment; worker health and safety; and unanticipated discoveries. During the construction phase measures will be implemented to control dust, control noise levels by erecting sound barriers if needed, keep construction waste separate from hazardous waste; handle, collect and dispose of all waste appropriately; and enforce a project security and safety plan for the protection of site workers. No adverse effect would occur to threatened and endangered species, sensitive habitats, or protected areas. The project has been found to have an overall beneficial effect on the economy, infrastructure, and security of Afghanistan.

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## APPENDIX A: LIST OF THREATENED AND ENDANGERED SPECIES OF AFGHANISTAN

| <u>Common Name</u>        | <u>Scientific Name</u>           |
|---------------------------|----------------------------------|
| Afghan flying squirrel    | <i>Hylopetes baberi</i>          |
| Afghan fox                | <i>Vulpes cana</i>               |
| Afghan mouse-like hamster | <i>Calomyscus mystax</i>         |
| Afghan tortoise           | <i>Testudo horsfieldii</i>       |
| Afghani brook salamander  | <i>Batrachuperus mustersi</i>    |
| African lion              | <i>Panthera leo</i>              |
| Algali (Marco Polo sheep) | <i>Ovis ammon</i>                |
| Alpine musk deer          | <i>Moschus chrysogaster</i>      |
| Asiatic black bear        | <i>Ursus thibetanus</i>          |
| Asp                       | <i>Aspius aspius</i>             |
| Baikal teal               | <i>Anas formosa</i>              |
| Black-tailed godwit       | <i>Limosa limosa</i>             |
| Blasius horseshoe bat     | <i>Rhinolophus blasii</i>        |
| Bucharian vole            | <i>Blanfordimys bucharicus</i>   |
| Cheetah                   | <i>Acinonyx jubatus</i>          |
| Cinereous bunting         | <i>Emberiza cineracea</i>        |
| Cinereous vulture         | <i>Aegypius monachus</i>         |
| Common otter              | <i>Lutra lutra</i>               |
| Corncrake                 | <i>Crex crex</i>                 |
| Dalmatian pelican         | <i>Pelecanus crispus</i>         |
| Euphrates jerboa          | <i>Allactaga euphratica</i>      |
| Eurasian lynx             | <i>Lynx lynx</i>                 |
| European roller           | <i>Coracias garrulus</i>         |
| Falcated duck             | <i>Anas falcata</i>              |
| Forest dormouse           | <i>Dryomys nitedula</i>          |
| Fraternal myotis          | <i>Myotis frater</i>             |
| Geoffrey's bat            | <i>Myotis emarginatus</i>        |
| Goitered gazelle          | <i>Gazella subgutturosa</i>      |
| Goral                     | <i>Naemorhedus goral</i>         |
| Great bustard             | <i>Otis tarda</i>                |
| Great snipe               | <i>Gallinago media</i>           |
| Greater horseshoe bat     | <i>Rhinolophus ferrumequinum</i> |
| Greater spotted eagle     | <i>Aquila clanga</i>             |
| Grey dwarf hamster        | <i>Cricetulus migratorius</i>    |
| Himalayan yew             | <i>Taxus wallichiana</i>         |
| Houbara bustard           | <i>Chlamydotis undulata</i>      |
| Hyles hippophaes          | <i>Hyles hippophaes</i>          |
| Imperial eagle            | <i>Aquila heliaca</i>            |
| Indian vulture            | <i>Gyps indicus</i>              |
| Kashmir cave bat          | <i>Myotis longipes</i>           |

| <u>Common Name</u>     | <u>Scientific Name</u>             |
|------------------------|------------------------------------|
| Laggar falcon          | <i>Falco jugger</i>                |
| Lesser flamingo        | <i>Phoenicopterus minor</i>        |
| Lesser kestrel         | <i>Falco naumanni</i>              |
| Lesser noctule         | <i>Nyctalus leisleri</i>           |
| Little bustard         | <i>Tetrax tetrax</i>               |
| Long-tailed marmot     | <i>Marmota caudata</i>             |
| Marbled teal           | <i>Marmaronetta angustirostris</i> |
| Markhor                | <i>Capra falconeri</i>             |
| Mehely's horseshoe bat | <i>Rhinolophus mehelyi</i>         |
| Mouflon                | <i>Ovis orientalis</i>             |
| Mountain noctule       | <i>Nyctalus montanus</i>           |
| Ounce                  | <i>Uncia uncia</i>                 |
| Pale-backed pigeon     | <i>Columba eversmanni</i>          |
| Pallas's cat           | <i>Otocolobus manul</i>            |
| Pallas's fish-eagle    | <i>Haliaeetus leucoryphus</i>      |
| Pallid harrier         | <i>Circus macrourus</i>            |
| Parnassius autocrator  | <i>Parnassius autocrator</i>       |
| Pinus gerardiana       | <i>Pinus gerardiana</i>            |
| Rana terentievi        | <i>Rana terentievi</i>             |
| Rhesus macaque         | <i>Macaca mulatta</i>              |
| Rueppell's fox         | <i>Vulpes rueppelli</i>            |
| Sand cat               | <i>Felis margarita</i>             |
| Sind bat               | <i>Eptesicus nasutus</i>           |
| Saker falcon           | <i>Falco cherrug</i>               |
| Siberian crane         | <i>Grus leucogeranus</i>           |
| Slender-billed curlew  | <i>Numenius tenuirostris</i>       |
| Sociable lapwing       | <i>Vanellus gregarius</i>          |
| Striped hyaena         | <i>Hyaena hyaena</i>               |
| Tiger                  | <i>Panthera tigris</i>             |
| Tytler's leaf-warbler  | <i>Phylloscopus tytleri</i>        |
| Wild goat              | <i>Capra aegagrus</i>              |
| White-headed duck      | <i>Oxyura leucocephala</i>         |
| White-rumped vulture   | <i>Gyps bengalensis</i>            |
| Zarundny's jird        | <i>Meriones zarudnyi</i>           |
| Thomas's pygmy jerboa  | <i>Salpingotus thomasi</i>         |
| Ulmus wallichiana      | <i>Ulmus wallichiana</i>           |
| White-browed bushcat   | <i>Saxicola macrorhynchus</i>      |

Accessed from <http://www.iucnredlist.org>

## APPENDIX B: LIST OF HABITAT OF SPECIAL INTEREST IN AFGHANISTAN

| Area                 | Habitat Type                   | Within Project Area? |
|----------------------|--------------------------------|----------------------|
| Ab-i-Istada          | Lake                           | No                   |
| Bande Amir           | Lakes                          | No                   |
| Darqad               | River floodplain               | No                   |
| Dashte Nawar         | Desert plateau                 | No                   |
| Hamun-i-Puzak        | Lake                           | No                   |
| Hari Rud             | Valley                         | No                   |
| Imam Sahib           | River floodplain               | No                   |
| Jalalabad            | Valley                         | No                   |
| Khost                | Foothills                      | No                   |
| Kole Hashmat Khan    | Wetland                        | No                   |
| North-western steppe | Plains                         | No                   |
| Pamir-i-Buzurg       | Mountains                      | No                   |
| Pech and Waygal      | Valleys                        | No                   |
| Registan desert      | Desert                         | No                   |
| Safed Koh            | Mountains                      | No                   |
| Salang Kotal         | Mountains                      | No                   |
| Small Pamir          | Mountains, valleys, and rivers | No                   |

Accessed from <http://www.birdlife.org>