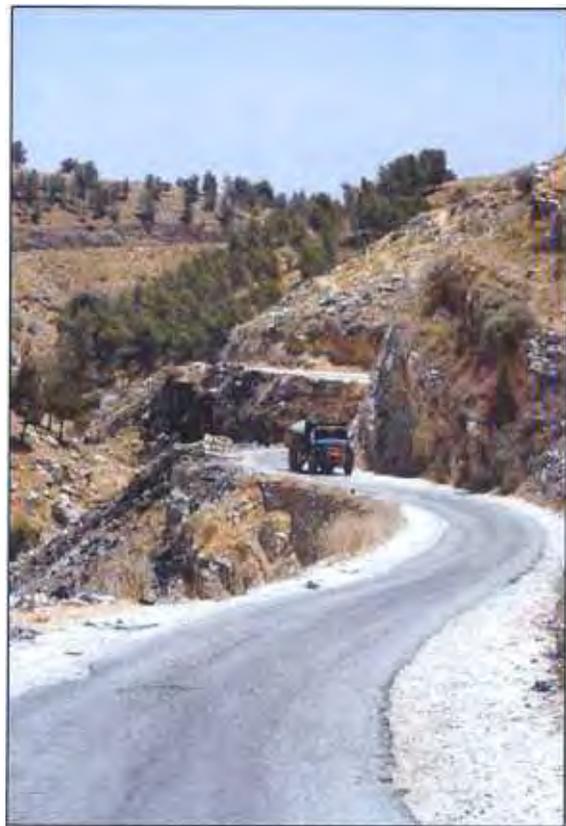




AL BADHAN-AL FAR'A-TUBAS ROAD ENVIRONMENTAL ASSESSMENT *ANE 05-137 WBG ROD*

The United States Agency
For International Development
West Bank and Gaza Mission

Palestinian
National Authority
Ministry of Public Works



Prepared by:

In association with:



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EXECUTIVE SUMMARY

ES-1 Introduction

To support the people of the West Bank and the Palestinian National Authority, and to improve the condition of roads in selected locations, the United States Agency for International Development (“USAID”) has proposed to finance the rehabilitation, reconstruction, and resurfacing of the Al Badhan-Al Far’a-Tubas Road located in the Nablus and Tubas Governorates. During discussion of priority projects with USAID, the Ministry of Public Works and Housing, Ministry of Local Government, and the Ministry of Planning identified this project as a priority project.

This Environmental Assessment (EA) was conducted between May 2005 and June 2005, to determine the reasonably foreseeable significant social and environmental effects, both beneficial and adverse, that the Proposed Project and the alternatives could be expected to have during and after construction. The EA is intended to provide the decision makers with a comparison of the impacts of each alternative in order to allow them to make an informed decision as to which, if any, alternative to construct. The assessment includes discussions of efforts to avoid or minimize the adverse effects and methods to maximize the positive effects.

Before an environmental analysis begins, the agency determines the appropriate level of study to identify issues and concerns that will be the focus of the assessment effort. Project scoping accomplishes this through early coordination with interested and impacted agencies, stakeholders and the public. The Scoping Session and other individual meetings required under USAID guidelines provide the first opportunities to present views regarding potential project impacts. These views, together with the requirements of EQA and USAID regulations, are the basis for development of the EA.

The project team held a Scoping Session in Al Far’a on June 1, 2005. The meeting covered a broad range of topics including project design, construction issues, environmental concerns focusing on solid waste management, and scope of work for the EA. During the meeting special emphasis was placed on the solid waste management problem along the road. The Governor of Jenin spoke on the subject, in addition to a representative from the Joint Services Council for Solid Waste Management. Comments and questions from the public focused primarily on the road design (drainage, lights, guardrails, road width, and other design issues) although there was concern over whether private property would be affected, and questions on the management on solid waste.

Key Issues

The environmental team carefully reviewed comments received from the public, stakeholders, and governmental agencies and determined that the following issues are relevant to the decisions that must be made for this project: health and safety, traffic, water resources, cultural resources, solid waste management, and natural areas and wildlife habitat.

ES-Table 1: Key Issues Considered in this Environmental Assessment

Issue	Reason for Consideration in the EA
	Existing road is unsafe; it is dangerously narrow in spots and visibility deficiencies are a major concern. Removal of the large volumes of trash/debris from the road and the Wadi Al Far’a will improve public health. Protection of workers and the public during construction is highly significant.
Traffic	The road often has high volumes of commercial traffic and is a primary artery for the area. Construction may impede traffic and impact local communities.

Issue	Reason for Consideration in the EA
Water Resources	The Al Far'a spring flows into the Wadi Al Far'a one of only four wadis in the West Bank that have permanent flow year around. Any contamination or damage to the Al Far'a spring and stream during construction could have serious impacts on the community.
Cultural Resources	Two archaeological sites have been identified in close proximity to the road; Tel Al Far'a an ancient settlement from the 7 th millennium, and a 15 th century water mill.
Solid Waste Management	As part of the project large volumes of trash/debris will be removed from the road and from the Wadi Al Far'a. The illegal dumping occurring along the roadside is a major health concern. Efforts should be made by the local communities to maintain the clean condition of the road and wadi after the project is complete.
Natural Areas and Wildlife Habitat	A section of the Wadi Al Far'a, the Al Far'a East, near the road is listed at an Ecologically Highly Significant Area. While this area is highly polluted with waste/debris and contains other signs of chronic and severe disturbance, potential impacts to this sensitive area from implementation of the project need to be assessed.

Project Need

Improvement of Al Badhan–Al Far'a-Tubas Road will include widening, reconstruction, and resurfacing of approximately 7 km of existing road. The primary purpose of this project is to improve the transportation network in the region, improve the level of service of the road, and to reduce the potential for accidents due to the poor condition of the road and the outdated design of the existing route. Much of this 7 km segment is in disrepair and in places the road is dangerously narrow with sharp bends that make it difficult to see oncoming traffic. Currently, no guardrails exist to protect travelers from the steep drop into the Wadi Al Far'a. The narrow lanes, lack of shoulders, limited sight distance, sharp curves, and steep grades are major safety concerns for this route.

The road is a primary artery for the area, and therefore improvement is a high priority. It serves all commercial traffic traveling from Jericho and Nablus connecting to Tubas, Jenin, Qalqilya and Tulkarem Districts. Recently this section of highway has become the main route due to closure of the Nablus-Al Badhan Road (Highway 57)

Proposed Action

Improvement of Al Badhan–Al Far'a-Tubas Road will include widening, reconstruction, and resurfacing of approximately 7 km of existing road to improve safety and level of service. Traffic signage, safety markings, sidewalks, lane marking, repair of existing stonewalls, and drainage improvements will be provided. Major widening and realignment of a narrow gorge section of Al Badhan will be performed by lowering the existing road by 5m depth and removing the existing stonewall structure. The excavated material will be reused to construct the new alignment. In places it will be necessary to remove rock from the hillside to improve visibility. Construction will occur within the existing right-of-way and will not divert from the existing road. Private property will not be required.

In conjunction with the road improvements, the Al Far'a stream will be cleaned of the large volumes of garbage currently being dumped over the road edge. A new guardrail will be installed along the new road alignment to improve safety and discourage future dumping.

Alternatives Considered

Alternative 1 – Resurface Only

Under this alternative the road will be resurfaced and guardrails placed in particularly narrow areas for safety. Although the surface will be improved, the road will not be widened and the

current dangerously narrow lanes will remain unchanged. Limited visibility will continue to be a safety concern. Under this alternative, the trash/debris will be removed from the area.

No-action Alternative

Under the No-action Alternative there will be no improvement to the road. The road will continue to deteriorate and be characterized by unsafe narrow lanes and poor visibility. The large volumes of trash and debris will remain, creating a degraded environment and contributing to the pollution of the stream.

Environmental Consequences

The sensitive cultural and natural resources in the study area were inventoried during field investigations and through literature review and are discussed at length in Section 4. During initial field visits and project investigation, it was found that there was potential for significant impacts resulting from construction activities to the Al Far'a spring and downstream waters, the Wadi Al Far'a East (a significant natural area) and to two significant cultural resources, the Tel Al Far'a and a 15th century watermill. Section 5 discusses in detail the potential impacts to these resources from implementation of the Proposed Action or the alternatives. It has been determined that there will be no impacts to the sensitive environmental and cultural resources in the area from implementation of the Proposed Action as long as the mitigation measures listed in Section 6 are strictly adhered to.

Conclusion

This Environmental Assessment concludes that the Proposed Action is necessary to meet the project needs of improving the regional transportation network, improving level of service, and improving safety on Al Badhan-Al Far'a-Tubas Road. This action will also improve the natural and human environment by the removal of the trash/debris illegally dumped along the road. The Proposed Action will have no significant adverse social, economic, or environmental impacts at levels that would warrant an Environmental Impact Statement as long as Palestinian engineering practices, codes, and regulations are adhered to, and mitigation measures are implemented during construction. Unless significant impacts are identified as a result of agency review, this process will require no further environmental analysis.

SECTION 1

Introduction

To support the people of the West Bank and the Palestinian National Authority, and to improve the condition of roads in selected locations, the United States Agency for International Development (“USAID”) has proposed to finance the rehabilitation, reconstruction, and resurfacing of the Al Badhan-Al Far'a-Tubas Road located in the Nablus and Tubas Governorates. During discussion of priority projects with USAID, the Ministry of Public Works and Housing, Ministry of Local Government, and the Ministry of Planning identified this project as a priority project.

1.1 Objectives and Scope of Work

The Donor community has combined efforts for an assessment of damage in the West Bank and Gaza since March 1, 2001. This group developed a report of priority projects for each sector and geographic area. After reviewing this report, the USAID West Bank and Gaza Mission decided to focus its response to road rehabilitation projects. This program, Priority Roads Phase 3 Program, includes the rehabilitation and reconstruction of seven priority roads, identified during discussions with the Ministry of Public Works and Housing, Ministry of Local Government, and the Ministry of Planning. This program is designed to rehabilitate the priority roads damaged by military incursions and lack of maintenance, to bring tangible benefits to the Palestinian people, provide a boost to the Palestinian economy, and strengthen the municipal transportation infrastructure. An Initial Environmental Evaluation (IEE) was completed for the seven priority roads. Based on the results of background research and field studies, the IEE recommended further evaluation and an Environmental Assessment (EA) for Al Badhan-Al Far'a-Tubas Road.

The purpose of this EA is to evaluate the project impacts according to USAID and Palestinian environmental guidelines, and to identify mitigation measures and monitoring requirements where appropriate.

1.2 Environmental Assessment Requirements and Procedures

Projects supported by U.S. government funds are subject to U.S. as well as local environmental regulations. Under both Palestinian and U.S. law, projects that require construction can require preparation of an EA or Environmental Impact Assessment (EIA), once a formal agency determines whether a proposed agency action may have a significant environmental impact. This report was prepared in accordance with USAID environmental procedures found in 22 Code of Federal Regulation (CFR) Part 216. Table 1 presents a summary of these procedures.

Table 1. Summary of USAID Environmental Procedures

USAID Procedure	Description of Procedure	Remarks
Initial Environmental Examination (IEE)	First review of reasonably foreseeable environmental effects of a proposed action	Not required for Al Badhan-Al Far'a-Tubas Road.
Threshold Decision	A formal agency decision that determines whether a proposed agency action is a major action affecting the environment.	USAID determined this project requires an Environmental Assessment (EA)
Negative Declaration	Written declaration that the agency will not develop an EA or Environmental Impact Statement (EIS) for an Action	Not applicable to Al Badhan-Al Far'a-Tubas Road per 22 CFR 216.

USAID Procedure	Description of Procedure	Remarks
Scope of EA or EIS	Identification of significant action issues and determination of issues to be addressed in EA or Environmental Impact Study (EIS). Based on consultations with experts, public and private agencies and host governments.	Written Scoping Statement covering key issues and scope for EA or EIS submitted for review and approval by Bureau Environmental Officer (BEO)
Preparation of EA or EIS	A detailed study of the reasonably foreseeable significant impact, beneficial and adverse, of a proposed action on the environment.	Report is prepared for review and approval of BEO.
Monitoring and Mitigation	Monitoring and mitigation of impacts are an integral part of the EA or EIS and project implementation	EA or EIS includes a monitoring program that specifies responsibilities and reporting. The present EA will incorporate construction mitigation measures into project bid documents.
Revisions	In the case of major changes in the scope of work or nature of the project during its implementation, the Negative Declaration, EA or EIS will be reviewed and the above procedures will be carried out again.	Supplements to the EA or EIS will be required and BEO review and approval is required.

Palestinian environmental policies are outlined in "The Palestinian Environmental Assessment Policy" (2000) and are under the jurisdiction of the Environmental Quality Authority (EQA). Palestinian environmental policy defines types of projects likely to have environmental effects. Annex 1 to the policy lists 14 types of proposed projects for which an Environmental Impact Assessment (EIA) is mandatory. According to the Annex, extensions to these projects should be screened for the need for an EIA. This EA has been prepared to attempt to respond to both Palestinian and USAID environmental policies. For this project, the Palestinian Environmental Quality Authority (EQA) participated in the Scoping Meeting and was provided a copy of the Scoping Statement.

1.3 Scoping and Approach to the Environmental Assessment

Before an environmental analysis begins, the agency determines the appropriate level of study to identify issues and concerns that will be the focus of the assessment effort. Project scoping accomplishes this through early coordination with interested and impacted agencies, stakeholders and the public. The Scoping Session and other individual meetings required under USAID guidelines provide the first opportunities to present views regarding potential project impacts. These views, together with the requirements of EQA and USAID regulations, are the basis for development of the EA.

The project team held a Scoping Session in Al Far'a on June 1, 2005. The meeting covered a broad range of topics including project design, construction issues, environmental concerns focusing on solid waste management, and scope of work for the EA.

Sixty-nine people attended the meeting. Residents of Al Far'a Camp, Tubas, Tammun, Al Far'a Village, Al Badhan, Aqrabaniya, Nablus, Yassed, Jenin, and Talluza were present. The following agencies, localities, or groups were represented at the meeting. A list of attendees and the Meeting Minutes is provided in the appendix.

Governor of Jenin
Palestinian Environmental Quality Authority
Al Aqrabaniya Local Council
Al Far'a Local Council
Tubas Local Council
Al Far'a Camp
Yassed Local Council
Tammun Local Council
Talluza Local Council
Ministry of Irrigation
Ministry of Public Works and Housing
Ministry of Transportation
Ministry of Local Government
Tubas Municipality
Far'a Youth Center
Joint Services Council
Al Najah University
Birzeit University

During the meeting special emphasis was placed on the solid waste management problem along the road. The Governor of Jenin spoke on the subject, in addition to a representative from the Joint Services Council for Solid Waste Management.

Comments and questions from the public focused primarily on the road design (drainage, lights, guardrails, road width, and other design issues) although there was concern over whether private property would be affected, and questions on the management on solid waste. In addition, there were requests to extend the scope of the project to include additional roads. During the meeting it was stressed that the project would be contained within the existing right-of-way and would not deviate from the existing alignment, and that private land would not be required. The comments and questions were addressed right away during the meeting. The comments and questions from the meeting are provided in the appendix.

The environmental team developed a list of significant issues based on the results of the Scoping Session and consultations with governmental agencies. The EA team, in consultation with USAID and EQA, developed the proposed approach for evaluation of significant issues and the EA outline. A Scoping Statement that incorporates these results was subsequently reviewed and approved by USAID.

1.4 Key Issues and Issues Eliminated From Further Study

The environmental team carefully reviewed comments received from the public, stakeholders, and governmental agencies and determined that the following issues are relevant to the decisions that must be made for this project: health and safety; traffic; water resources; cultural resources; solid waste management; and natural areas and wildlife habitat.

The following environmental, social, and land use parameters: threatened and endangered species; land use; seismic, geology and soils; construction site debris; noise; and air quality were not identified as a project-specific issue or concern by the environmental team and therefore are not covered in detail in this document. Although not considered to be a major issue requiring a detailed analysis of effects, each topic was still carefully considered during the scoping process. The appendix contains the Environmental Scoping Statement which provides discussion of the issues that are, and that are not, considered significant.

SECTION 2

Purpose and Need

2.1 Need for the Proposed Project

Improvement of Al Badhan–Al Far'a-Tubas Road will include widening, reconstruction, and resurfacing of approximately 7 km of existing road. The primary purpose of this project is to improve the transportation network in the region, improve the level of service of the road, and to reduce the potential for accidents due to the poor condition of the road and the outdated design of the existing route. Much of this 7 km segment is in disrepair and is characterized by substandard vertical/horizontal geometrics. In places the road is dangerously narrow with sharp bends that make it difficult to see oncoming traffic. Currently, no guardrails exist to protect travelers from the steep drop into the Wadi Al Far'a. The narrow lanes, lack of shoulders, limited sight distance, sharp curves, and steep grades are major safety concerns for this route. Photo 1 shows the road's narrow width and dangerous curves.



Photo 1: Al Badhan-Al Far'a-Tubas Road

The road is a primary artery for the area, and therefore improvement is a high priority. It serves all commercial traffic traveling from Jericho and Nablus connecting to Tubas, Jenin, Qalqilya and Tulkarem Districts. Recently this section of highway has become the main route due to closure of the Nablus-Al Badhan Road (Highway 57). The population of the nearby communities and projected growth rates is provided in Table 2. The road serves over 150,000 residents from the nearby towns and communities; and serves a proportionally higher population when one considers that it serves the commercial traffic for the Tubas, Jenin, Qalqilya, and Tulkarem Districts. The population is expected to consistently increase throughout the area, and is predicted to more than double by the year 2020. Photo 2 shows the high volumes of traffic that are often present on the road today. Currently, heavy truck/tractor and bus traffic make up a considerable percentage of the traffic on the road.

Table 2: Population of Communities in the Project region*

	1997	2000**	2010**	2020***
Nablus	98,919	110,966	167,195	251,000
Jenin	26,332	29,527	44,699	67,000
Tubas	11,617	13,116	20,269	30,000
Aqqaba†	4,443	5,018	7,528	11,000
Al-Fara'a Camp	4,152	4,688	7,244	11,000
Talluza	1,977	2,218	3,341	5,000
Al Badhan	1,786	2,004	3,019	5,000

**Source: Wilber Smith Associates. 1991. Nablus-Jenin Highway Environmental Assessment*

***Forecast by PCBS*

**** Extrapolated based on 1997-2010 growth rates*

**All number beyond 1997 extrapolated based on constant regional growth rate.*



Photo 2: High volumes of traffic on Al Badhan-Al Far'a-Tubas Road

The road system plays an important role in the socio-economic character of an area. Clearly, the Al Badhan-Al Far'a-Tubas Road is very important for commerce flow in the area and an improved level of service and safety will promote economic development and development opportunities in the surrounding communities. The area is agriculturally oriented focusing on crop production, fruits, and vegetables. Improvement of the road will make it easier for farmers to transport crops, produce, and other agricultural products to markets. Improved access will be provided for other goods and services.

Before the military incursions, the tourism industry was well-developed in the Al Badhan area with tourists visiting during the spring and summer to enjoy the restaurants, the local parks, and the swimming pools built around the area's natural springs. Tourism in Al Badhan has declined significantly with the military incursions and road closures of the past five years. It is expected that this project will stimulate tourism in the area by providing an improved and safer transportation network. Furthermore, the area will be made more pleasant to tourists and local residents by the removal of the unsightly and unsafe volume of trash and debris that are currently being dumped from the road.

SECTION 3

Alternatives Including the Proposed Action

3.1 Proposed Action

The project is located in the northern West Bank area south of Tubas and north of Nablus, within the Tubas and Nablus Governorates. Specifically, improvements will begin at the Al Malaqi Bridge in the Nablus District and will continue north through the Al Far'a Refugee Camp up to the Tammun intersection in the Tubas District. Figure 1 shows the location of the project.

Improvement of Al Badhan–Al Far'a-Tubas Road will include widening, reconstruction, and resurfacing of approximately 7 km of existing road to improve safety and level of service. The rehabilitation work will include excavation of the damaged road, then relaying with a pulverizing layer and two layers of base material and resurfacing with a 7m wide asphalt concrete pavement with 7cm of wearing course. The asphalt and macadam layers on the existing road will be removed and reused as a sub base. Traffic signage, safety markings, sidewalks, lane marking, repair of existing stonewalls, and drainage improvements will be provided. Major widening and realignment of a narrow gorge section of Al Badhan will be performed by lowering the existing road by 5m depth and removing the existing stonewall structure. The excavated material will be reused to construct the new alignment. In places it will be necessary to remove rock from the hillside to improve visibility.

It is important to note that construction will occur within the existing right-of-way and will not divert from the existing road. Private property will not be required.

In conjunction with the road improvements, the Al Far'a stream will be cleaned of the large volumes of garbage currently being dumped over the road edge. A new guardrail will be installed along the new road alignment to improve safety and discourage future dumping.

Two alternatives are under consideration for this project. These alternatives are discussed below

3.2 Alternative 1 – Resurface Only

Under this alternative the road will be resurfaced and guardrails placed in particularly narrow areas for safety. Although the surface will be improved, the road will not be widened and the current dangerously narrow lanes will remain unchanged. Limited visibility will continue to be a safety concern. Under this alternative, the trash/debris will be removed from the area.

3.3 No-action Alternative

Under the No-action Alternative there will be no improvement to the road. The road will continue to deteriorate and be characterized by unsafe narrow lanes and poor visibility. The large volumes of trash and debris will remain, creating a degraded environment and contributing to the pollution of the stream.

Insert Figure 1 – Project Area

SECTION 4

Affected Environment

This chapter describes the present condition of the environment within the project area. The key issues generated through the scoping process define the general scope of the environmental concern for the project. This chapter forms the scientific and analytic basis for the comparison of the alternatives.

4.1 Field Study

Field activities involved a site visit on May 15-16, 2005 by the project scientist, project engineer, and by experts from Birzeit University (archaeologists, a botanist, wildlife biologist, and a geographer), to determine the need for an environmental assessment and to identify significant environmental issues that should be studied during the environmental assessment process. The field activities focused on the potential archaeological resources including and surrounding the proposed construction area, the presence of sensitive species or habitats, and surrounding land uses. Additional information was gathered from the available literature and by conversations with the Palestinian Environmental Quality Authority and the Joint Services Council.

4.2 Water Resources

The Al Badhan-Al Far'a-Tubas Road is located in close proximity to the Wadi Al Far'a, one of the main flood wadis in the West Bank with a watershed length of 20 km. The Wadi Al Far'a descends east from Nablus to the Jordan River, eventually draining to the Dead Sea. Water in the Wadi Al Far'a is permanent, flowing year around. With a total discharge of 14.1 MCM/yr, springs provide the baseflow component of the system, thus preventing the Wadi el-Far'a stream from drying up in the summer. The perennial spring system is supplied by a complex of 14 springs, the most famous of which is the Al Far'a spring (Birzeit University-Calvin College Partnership 2003). The Wadi Al Far'a is characterized by hills and basins and a steep descent from the mountain ridges to the valley floor.

The Al Far'a spring is located next to the road in the Al Far'a Camp and is widely used for human consumption and irrigation. While this spring is the dominant feeding spring for the Wadi Al Far'a, a second smaller spring, Daleib spring, is located a short distance south of the Al Far'a spring. Both springs are located in close proximity to the road; Figure 1 shows the locations of the two springs. Recently a concrete structure has been constructed to cover and protect the Al Far'a spring (Photo 3). Water from the Al Far'a spring is used for supplying the Al Far'a Refugee Camp and Al-Far'a village with domestic water. The rest of the water flows in the Wadi Al Far'a and is used for irrigation. Another spring system, the Al Badhan spring system, is located northeast of Nablus and west of the project area. This spring system includes three main springs that drain to Wadi Al Badhan then to Wadi Al Far'a and are used for irrigation purposes.

Most Wadis are seasonal and flow only during the winter season during flood periods. The Wadi al Far'a is only one of four wadis that has permanent flow year round (MOPIC 1998). It is important to note, however, that between the years 2000-2003 the spring did not flow during the mid summer months. The cause of the drought was believed to be from lack of rainfall and from an increase in water pumped from the surrounding wells lowering the groundwater table (Birzeit University-Calvin College Partnership 2003).



Photo 3: Protected Al Far'a Spring (structure on the left of photo)

The Wadi Al Far'a is part of the larger regional Dead Sea Rift Zone that has formed numerous horst and grabens that confine the surface water drainage system of the Wadi Al Far'a. In the West Bank, aquifer formations are part of three main basins: Western, Eastern, and North Eastern Basins, which form the Mountain Aquifer. The Wadi Al Far'a is contained within the Eastern Mountain Aquifer System (MOPIC 1998). Within the Eastern Mountain System, the aquifer system feeding the Wadi Al Far'a is the Jenin Subseries which is made of limestone and chalky limestone and is located in the north of the West Bank around the city of Jenin; it is considered to be a good local aquifer (MOPIC 1998). This aquifer system also feeds the Nablus, Sabastiye, and Al Badhan springs, and feeds the shallow groundwater wells in the Jenin area.

Two primary factors contributing to the degradation of water quantity and quality include contamination of wadis and inadequate protection of aquifer recharge areas. As part of the Emergency Natural Resources Protection Plan, MOPIC (1998) classified different areas based on the degree of sensitivity to the pollution of groundwater aquifers. In order of greatest protection to least these classifications are:

- Highly Sensitive
- Locally Highly Sensitive
- Sensitive
- Moderately Sensitive
- Not Sensitive

According to this plan, strips around the four permanent wadis in the West Bank were drawn. These wadis are considered to be sensitive recharge areas although the area around the wadis is considered not sensitive. Because it is one of the four permanent wadis, the Wadi Al Far'a is considered a Sensitive Recharge Area. The sensitivity is dependent on the fact that development near the streams could cause deterioration of water quality (MOPIC 1998).

Many of the villages in the area have no sewer system, but instead rely on latrine pits or pumping to the Wadi Al Far'a for disposal of wastewater (Birzeit University-Calvin College Partnership 2003). Nablus-East, however, is the major pollution source for the water running into the Wadi Al Far'a system. Nablus east-side untreated wastewater is discharged to Wadi

Al Sajour which meets and connects to the Wadi Al Hammam, in the Talluza area. The wastewater then flows into Wadi Al Badhan towards the east and discharges into Wadi Al Far'a polluting the downstream water.

Within the project area, a major environmental and health concern is the large volume of trash/debris that is being dumped from the Al Badhan-Al Far'a Road into the Wadi Al Far'a and the Al Far'a stream. This issue is addressed herein in the section on Solid Waste Management.

4.3 Cultural Resources

Human history in Palestine extends over a million years and contains a richness and complexity not found in other areas due to the fact that Palestine is a narrow land bridge between Africa and Asia over which peoples from north and south have moved continuously. The northern district of Palestine was important to the history of the region, serving as an economic and military corridor between Egypt (to the south) and Syria (to the north) for four thousand years, from 3,000 B.C. until the Crusader period (1187 A.D.).

As part of the Emergency Natural Resources Protection Plan, the Ministry of Planning and International Cooperation (MOPIC 1999) and the Ministry of Antiquities have developed a list of endangered cultural heritage sites in the West Bank that should be protected from development. There are two sites listed as endangered cultural heritage sites within close proximity to the road: Tel Al Far'a and Wadi Badhan-Wadi Far'a. The location of Tel Al Far'a was confirmed during the field investigation. It is located in the Al Far'a refugee camp on a steep hill next to the road. The Al Far'a spring is located at the foot of this hill. This site is believed to be the biblical town of Tirzah (circa 5,000 BCE), and there is evidence that the first settlers arrived as early as the 7th millennium (De Vaux and Chambon 1993).

In the 3rd millennium, the city of Tel Al Far'a prospered and was fortified by a wall with a stone rampart. Eventually the city became one of the most important Canaanite city states around which a new wall was built. Today an earthen wall from this settlement is located on the edge of the Al Badhan-Al Far'a-Tubas Road. The city was destroyed and rebuilt several times; it was later abandoned after the spread of epidemics from the Babylonian invasion of the 6th century BC (MOPIC 1999). This site has a high potential to be promoted for tourism (Birzeit University-Calvin College Partnership 2003).

A 15th century water mill located in the valley adjacent to the Al Badhan-Al Far'a road upstream of the Al Malaqi bridge was also identified during the field investigation. This water mill is located close to the Wadi Badhan-Wadi Far'a, a listed endangered cultural heritage site that is known for the many historic water mills and Roman caves that are contained within the area (MOPIC 1999). Table 3 provides a summary of the archaeological resources in the project area; Figure 1 shows the locations of these sites.

Table 3: Archaeological Resources Within the Project Area

Name	Site Location	Age	Site Importance
	South-west of Al Far'a Village; near the Al Far'a Spring	First settlers as early as 7,000 BCE	Canaanite City, believed to be the biblical city of Tirzah. Listed as an endangered cultural heritage site.
Water Mill	Upstream of the Al Malaqi Bridge near Wadi Badhan-Wadi Far'a area.	15 th century. Likely used until the 20 th century.*	Wadi Badhan-Wadi Al-Far'a is listed as an endangered cultural heritage site.

*Correspondence with Dr. Kamal Abdulfattah, Birzeit University, Expert in Geography, Archaeology, and Cultural Landscapes.

The remains of a Crusader castle are located approximately 0.5 km away in view of the road. This is well outside of the project boundaries.

4.4 Natural Areas and Wildlife Habitat

Natural areas and wildlife habitat includes native or naturalized plants and plant communities that support native wildlife. The road improvements will be made to the existing road that has already altered the natural environment. During the field survey, only weeds and common plant species were observed along the existing road.

MOPIC (2000) developed an inventory of ecologically significant and sensitive areas in the West Bank for the *Emergency Natural Resources Protection Plan*. Determination of a site as an ecologically sensitive area was based on the following criteria:

- Exceptional habitat or biological communities present
- An ecosystem with limited representation
- Unusually high diversity of biological communities or species
- Provides a natural habitat for indigenous species that are rare or endangered
- Key lynchpin or watershed with ramifications for adjacent areas.

The effort was aimed at classifying areas in the West Bank as Highly Significant, Moderately Significant, or Not Significant. Based on these criteria, a section of the Wadi Al Far'a, the Wadi Al Far'a East, has been listed by MOPIC as an Ecologically Highly Significant Area, although it was observed during the field investigations for this project that it is polluted with waste/debris and contains other signs of severe disturbance.

Al Far'a East (JN-6) is a 1,000 dunum site, located approximately 0.5 km southeast of the Al Far'a Camp between the Al Far'a Camp and the Al Malaqi Bridge. The area is located 100-200 m above sea level and receives approximately 450-500mm rainfall annually. The year-around flow of water from the Al-Far'a spring, and location at the periphery of the Tammun Nature Reserve allow this area to support numerous plants and animals that are rare elsewhere in the project region. The area is high in biodiversity because of its location on the transitions between the Mediterranean territory and the Irano-Turanian territory. Several wild plant species grow here including *Ceratonia siliqua*, *Crataegus aronia*, *Quercus calliprinos*, *Calycotome villosa*, *Retama raetam*, *Pistacia lentiscus*, *Ziziphus spina-christi* and others. Furthermore, the continuously flowing Al Far'a stream creates a wetland environment that supports plant species adapted to such an environment contributing to the uniqueness of the area.

Just southeast of the project limits, another section of the Wadi Al Far'a is also listed as an Ecologically Highly Significant Area. This area begins near the Al Aqrabaniye village and follows the Al Far'a stream downstream. While the Al Aqrabaniye site (N3) is ecologically important it is located outside of the boundaries for this project and will not be affected by the project.

According to the study completed by Birzeit University-Calvin College Partnership (2003) the Wadi Al Far'a has suffered from vegetation degradation as a result of overgrazing, over-cutting of vegetation, polluted waters, and the take-over of non-indigenous species. Israeli settlements and military policies and procedures have also significantly impacted the biological environment in the Wadi Al Far'a. The ecological integrity of the area is also being significantly compromised by the current practice of dumping municipal trash over the road and into the wadi.

4.5 Health and Safety

The primary purpose of this project is to improve the level of service and to reduce the potential for accidents due to the poor condition of the road and the outdated design of the existing route. The road is in disrepair and is characterized by substandard vertical/horizontal geometrics. In places the road is dangerously narrow with a sharp drop into the adjacent valley. There are no guardrails on the existing road. The narrowness of the road and visibility deficiencies are major safety concerns for this route.

Again, large volumes of household trash/debris have been dumped alongside the road and into the Wadi Al Far'a creating a nuisance and posing a significant risk to public health. The Al Far'a stream as it flows through the Wadi Al Far'a is used extensively for irrigation purposes.

Health and safety for workers and the public may be affected during construction activities. Increased traffic due to lane closures, movement of heavy machinery and construction materials, and increased dust and noise pose a risk to both workers and the public. Workers may be affected by prolonged exposure to sun and heat and by exposure to the solid waste during clean up activities.

Traffic

Because Al Badhan-Al Far'a-Tubas Road is a main route for commercial traffic traveling from Jericho and Nablus and servicing Tubas, Jenin, Qalqilya, and Tulkarem Districts any construction has the ability to change traffic patterns, impede traffic and impact the local communities. The existing road is very narrow in places and supports high volumes of traffic from heavy trucks/tractors, buses, and small vehicles.

Solid Waste Management

The improper handling of solid waste in Palestine has been identified as a major cause of water quality deterioration, land degradation, air pollution, and aesthetic degradation (MnEA 2000). Within the Al Far'a watershed, the status of solid waste management is considered inadequate and falls far behind modern standards of waste management. Palestinian regulations prohibit random dumping, however, these regulations are rarely enforced. Random dumping of waste is frequent and has, historically, been caused by a lack of designated dumping sites. Waste collection vehicles are rare and only exist in the Al-Far'a refugee camp and in Al-Jiftlik. Generally, waste disposal occurs when the village councils subcontract for a local vehicle to haul the waste away with collection occurring once or twice a week from designated collection points. The village councils have no authority on the fate of the waste after it is collected (Environmental Quality Authority 2004). In the past, this problem has been exacerbated by road closures in the area, making it very difficult to reach designated dumping sites. There are currently five controlled dump sites in the area, the closest is just north of Tubas, within the Tubas municipality, in Einoun. Figure 1 shows the approximate location of this dump site. The distances between the Einoun controlled dump site and sites within the project area are provided in Table 4.

Table 4: Distances between Einoun Controlled Dump Site and Selected Within the Nablus and Tubas Districts*

Location		Distance/km
Einoun Controlled Dump Site (CDS)	Tubas	3.5
Einoun CDS	Tammun Intersection	4.7
		6.7**
		8.7**
		10.8**
		11.5**
		15.2
		21.7
Einoun CDS	Biet Daggan	23.8
Einoun CDS	Biet Foureek	29.2

*Source: Data provided by the Environmental Quality Authority during a meeting May 24, 2005.

**Locations along the project alignment

The World Bank, in concert with the EU and local support, is funding the Solid Waste and Environmental Management Project in the West Bank, with the objective of implementing an environmentally sound solid waste management system for the Jenin-Tubas District (World Bank Group website 2005). One component of this program is the design and construction of a controlled sanitary landfill in Zahrat Al-Fanjan in the Jenin District to consolidate all solid waste in the Jenin-Tubas Districts. A bylaw has been prepared under this program to regulate solid waste management issues. In addition, the Jenin Joint Services Council for Solid Waste Management has been established to control and manage solid waste collection and disposal. Other program components include equipment supply for collection, haulage, and disposal of solid wastes; an institutional capacity building program for the Joint Services Council; and a public awareness campaign.

Within the project area, large volumes of municipal household waste/debris are currently being illegally dumped off of the Al Badhan-Al Far'a road north of the Malaqi Bridge (Photo 4). This issue has been identified as a significant problem in the area and was discussed during the Public Scoping Meeting during which the Governor of Jenin and a representative of the Joint Services Council spoke on the subject.



Photo 4: Photo showing illegal dumping into the Wadi Al Far'a within the project area.

SECTION 5

Environmental Consequences

This chapter describes the changes that may be expected by implementing one of the action alternatives or by taking no action. Cumulative effects are discussed in this section. Cumulative effects result from incremental impacts of proposed activities when added to other past, present, and reasonably foreseeable actions regardless of what agency or person undertakes such other actions.

5.1 Water Resources

Proposed Action - Because of the importance of the Al Far'a spring and stream to the local communities, to the environment, and to area wildlife, any contamination or damage from construction activities could have serious consequences. Reconstruction of Al Badhan-Al Far'a-Tubas Road, however, will not result in adverse impacts to the Al Far'a spring or to the downstream waters, although the close location of the spring and stream to the road will require measures to protect the stream from impacts during construction. During construction, waste such as dirt, construction materials, aggregates, concrete, asphalt, etc. will be generated. Stringent sediment control procedures will need to be implemented to prevent these wastes washing with rainwater into the Al Far'a spring and stream. Construction spoil piles and waste material will be stored temporarily at designated protected areas located an appropriate distance from the spring and downstream waters to avoid possible impacts. Additional mitigation will consist of the temporary installation of a physical barrier in the wadi to separate the stream and riparian vegetation from equipment, materials, and personnel that may enter the wadi during construction and cleanup of the trash/debris. It will be necessary to allow some equipment into the wadi area for construction activities, and removal of the trash from the area. A dirt path/road is located in the wadi which can be utilized by construction equipment to avoid impacts to vegetation, wildlife habitat, and the Al Far'a stream. Section 6, Mitigation and Monitoring lists the mitigation measures that will be implemented to minimize and eliminate impacts.

The project will have a significant positive impact on the environmental conditions along the route, including positive impacts to water quality. Removal of the large volumes of trash and debris from the roadside and the wadi will improve water quality of the Al Far'a stream, providing benefits to area wildlife and the local human population. Cleanup of the area and improvement of the water quality is a key issue if the area is to be a draw for tourism, as it was in the past. The improvements will include a guardrail to discourage continued dumping in this drainage. The guardrail will discourage but will not eliminate all future dumping. For the benefits of trash removal to continue, local communities must make improvements to solid waste management and enforce the existing regulations that prohibit random dumping.

Alternative 1 – Resurface Only – Under Alternative 1 there will be no impacts to the water quality of the Al Far'a spring or the Wadi Al Far'a from construction activities. The same mitigation measure will be in place as described above and the same improvements to water quality will occur with the removal of trash/debris and the installation of a guardrail. This alternative poses a lesser risk to the Al Far'a stream than the Proposed Action. The major excavation and reconstruction that will occur near Al Badhan to lower the road under the Proposed Action will not occur here. And, while some equipment and workers will need to enter the wadi area for trash removal, the level of activity in the wadi will be less than under the Proposed Action.

No-action Alternative – Under the No-action Alternative there would be no impacts to the water quality of the Al Far'a spring or the Wadi Al Far'a from construction activities. The large volumes of trash/debris, however, would remain along the roadside and in the wadi and would continue to pollute the area and impact water quality.

5.2 Cultural Resources

Proposed Action – Reconstruction of Al Badhan-Al Far'a-Tubas Road has the potential to damage the cultural resources located along the road if proper care and mitigation are not implemented during construction. Of particular concern is the Tel Al Far'a, located next to the road in the Al Far'a Camp. While most of the excavated areas and antiquities are located at the top of the Tel, part of an earthen wall is located along the shoulder of the road. The Project Manager for this project and the cultural resources expert from Birzeit University have been coordinating closely on what improvements can and cannot be done in this area to avoid disturbing the Tel Al Far'a. The road will not be widened in this area, only resurfacing will occur with minor excavation (0.5 m) to remove the existing road layers. There will be a protective exclusion zone around the ancient wall fragment where no excavation will occur. The wall and Tel will be completely avoided during construction activities. A footpath for pedestrian use is being considered for this area along the roadside but will not disturb the Tel. The cultural resources expert has approved of this approach; any significant changes will need to obtain his approval and concurrence.

Excavation to widen the road in the narrow gorge section of Al Badhan has the potential of unearthing new cultural resources. If this occurs, construction will cease until the Ministry of Tourism and Antiquities is alerted and provided time to assess the site. The existing stonewall structure that will be replaced in the narrow gorge section of Al Badhan was also assessed by the Birzeit University cultural resources expert, who confirmed that the structure is not a historical structure or an important cultural resource. He has approved the replacement of this structure.

The 15th century watermill on the Al Far'a stream will be avoided during construction. Mitigation measures to protect the Al Far'a stream (see Water Resources) will also protect the watermill. Equipment, materials, and personnel will not be allowed into the stream or be allowed to disturb the watermill. Adverse impacts are not expected.

Section 6, Mitigation and Monitoring, lists the mitigation measures that will be implemented to minimize and eliminate impacts to the cultural resources, both known and unknown, in the area.

Alternative 1 – Resurface Only – Under Alternative 1 there will be no impacts to the Tel Al Far'a or to the 15th century watermill from construction activities. This alternative does not pose any additional threat to cultural resources over the Proposed Action. As described above, extreme care will be used during resurfacing in the vicinity of the Tel Al Far'a. The same mitigation measures will be in place as described above and in Section 6.

No-action Alternative - Under the No-action Alternative there will be no impacts to the Tel Al Far'a or to the 15th century watermill from construction activities.

5.3 Natural Areas and Wildlife Habitat

Proposed Action – Although the Proposed Action will occur on existing right-of-way and will not divert from the existing road, the improvement has the potential to damage the natural areas and wildlife habitat located in the Wadi Al Far'a East if proper care and mitigation are not implemented during construction. The area is considered a Highly Significant ecological

resource and will need to be protected from impacts. Of particular concern during construction is the Al Far'a stream and the vegetation located along the stream and in the wadi. The mitigation measures described under 5.1. Water Resources will protect the vegetation and wildlife habitat within the wadi. Implementation of stringent sediment control measures, the installation of a physical barrier to protect the stream, and the use of the existing dirt road/path in the wadi to move equipment, materials, and humans will reduce impacts to the point of insignificance. Significant impacts are not expected.

Removal of the solid waste and installation of a guardrail to discourage dumping will significantly improve this sensitive natural area. Again, these improvements will be temporary unless illegal dumping is better controlled in the future.

Alternative 1 – Resurface Only – Under Alternative 1 there will be no impacts to natural areas or wildlife habitat from construction activities. The same mitigation measure will be in place as described above and the same improvements to the wadi will occur with the removal of trash/debris and the installation of a guardrail. This alternative poses a lesser risk to the habitat and vegetation in the wadi than the Proposed Action. Again, the major excavation and reconstruction that will occur near Al Badhan to lower the road under the Proposed Action will not occur here. Some equipment and workers will need to enter the wadi for trash removal, however, the level of activity in the wadi will be less than under the Proposed Action.

No-action Alternative - Under the No-action Alternative there will be no construction-related impacts to the natural areas and wildlife habitat that exist in the Wadi Al Far'a. However, the significant benefits to the environment from removal of the solid waste will not occur.

5.4 Health and Safety

Proposed Action – With proper planning and mitigation, there will be no negative impacts to the health and safety of workers or to the general public during construction. During construction, safety measures will be implemented to protect people from injury and adjacent property from damage. Workers will be protected with proper training and knowledge of the equipment/machinery they are handling. Implementation of an active safety program and provision of safety equipment will be required and will provide further protection. Measures will be provided to define and isolate construction zones by using warning signs, pylons, fencing, and ribbon barriers. During construction, the provision of a comprehensive safety plan and traffic plan, in addition to appropriate safety equipment, and proper training, will minimize risk and protect workers and the public. The Contractor is required to comply with all U.S. and local safety standards stated in their contract. See Section 6 for the mitigation measures that will be implemented during construction.

By widening and improving the road, this project will result in significant improvements to public health and safety. The road is dangerously narrow near Al Badhan with limited sight distance around curves. No guardrail exists to protect drivers from the steep drop into the Wadi Al Far'a. The Proposed Action will widen the road, improve sight distance, and install a guardrail providing significant safety benefits to the drivers using the road. Furthermore, the cleanup of the large volumes of trash/debris from the roadside and the Wadi Al Far'a will also provide significant health benefits. Again, these benefits will be temporary if the local communities continue to allow illegal dumping and fail to enforce Palestinian environmental regulations.

Alternative 1 – Resurface Only – During the construction period, this alternative will not result in any adverse impacts to the health and safety of workers or the public as long as the planning and mitigation measures described above and in Section 6 are implemented.

This alternative will not provide the significant safety benefits for drivers as provided under the Proposed Action. The existing narrow lanes and visibility deficiencies will remain posing a serious risk to public safety. This alternative does, however, make provisions for a guardrail protect drivers from the drop into the wadi.

The same benefits to public health from the removal of the trash/debris will occur as described above.

No-action Alternative - Under the No-action Alternative the road will continue to be very unsafe with narrow lanes, poor visibility, and an unprotected drop into the wadi. The large volumes of trash/debris will remain, and the benefits to public health will not occur.

5.5 Traffic

Proposed Action – It is expected that the Proposed Action will result in improvements to traffic after the road is widened and sight distance is improved. The road is a major artery in the area and currently carries large volumes of large and small vehicles. Widening the road, improving visibility, and improving safety should result in significant benefits to traffic flow.

Under this alternative there may be adverse impacts to traffic flow from construction activities, however, these impacts will be temporary and will be minimized by the mitigation measures described in Section 6. A detailed Traffic Plan will be prepared for the project and adhered to closely. Throughout most of the construction area an open lane will be maintained to allow traffic to pass with minimal disruption. In the narrow gorge area of Al Badhan, however, excavation and lowering of the road will require full closure of the road. In this area, an alternative route will be maintained to allow traffic through. Flagmen will be on-site directing traffic as necessary to maintain traffic flow and safe conditions.

Alternative 1 – Resurface Only – Like the Proposed Action, Alternative 1 may also have temporary, adverse, construction-related impacts on traffic flow that will be minimized with mitigation.

This alternative, however, will not produce the long-term benefits to traffic flow that will result from widening the road and improving sight distance. Resurfacing alone will not address traffic problems. The road is currently heavily utilized and will continue to be so in the future; the population is expected to increase significantly within the next 15 years. Traffic will continue to be a problem and will be exacerbated by population growth.

No-action Alternative - Under the No-action Alternative, the short-term inconvenience of possible traffic congestion and other traffic impacts from construction activities will not occur. However, like Alternative 1, the long-term benefits to traffic flow from widening the road and improving sight distance will also not occur.

5.6 Solid Waste Management

Proposed Action – The Proposed Action will have a significant positive impact on the solid waste management problem along the road. The area will be cleared of solid waste and a new guardrail will be installed discourage future dumping. It will be the responsibility of the local communities to maintain these improvements. To be successful, it will be very important that the local communities work together to implement a stronger solid waste management program with better oversight and quality control. Solid waste must be taken to one of the five controlled dump sites in the area. The closest, in Einoun, is less than 10 miles from the Al Far'a Camp and less than 12 miles from the Al Malaqi Bridge. During the June 1, 2005

Public Scoping meeting, the Governor of Jenin and a representative of the Joint Services Council for Solid Waste Management strongly encouraged the surrounding communities to use the controlled dump site near Tubas (in Einoun). To change the practice of illegal dumping, the public must be made aware of the risks associated with the practice and be encouraged to behave in a more responsible manner. Palestinian Law prohibits random dumping; the law needs to be enforced so that the frequency of the action is reduced. This is critical to protect the sensitive environment associated with the Wadi Al Far'a, to protect the water quality of the Al Far'a stream, to reduce the risk to human health, and to make the area more appealing to tourists and visitors.

The solid waste management problem may become less significant after the comprehensive solid waste management project in Jenin is completed and the sanitary landfill is constructed (estimated completion is 2006).

During the project, all trash/debris removed from the area during cleanup, and any construction debris generated that is not reused, will be disposed of in a designated disposal site in an environmentally safe manner. Because of its proximity to the project, the most likely disposal site is the dump site in Einoun.

The intent of the project is to reuse excavated material to the greatest extent possible. Mitigation measures will protect the sensitive environmental concerns in the Wadi Al Far'a from impacts from construction-generated waste.

Alternative 1 – Resurface Only – The same issues on solid waste management discussed for the Proposed Action also apply to Alternative 1. The trash/debris will be removed from the area under this alternative and a guardrail placed to discourage future dumping.

The amount of construction-generated waste will be lower under this alternative, in comparison to the Proposed Action, since major excavation will not occur. Mitigation measures will protect the environment from any construction waste generated during resurfacing of the road.

No-action Alternative – Under the No-action Alternative the large volumes of trash/debris will remain degrading the environment and posing a risk to public health.

5.7 Cumulative Effects

Cumulative effects are a result of the incremental impacts on a resource that result from the interaction of two or more individual actions. Cumulative effects can result from minor, but collectively substantial actions undertaken over a period of time. Cumulative effects can be either beneficial or adverse.

There are no known future construction projects that have been identified on Al Badhan-Al Far'a-Tubas Road that would result in adverse cumulative effects on the natural or human environment.

As part of the 1998 Wye River Agreement between the Palestinian National Authority and Israel, USAID proposed to finance the design and construction of a north-south highway in the northern part of the West Bank. The EA for this highway was completed in 2001 (Wilber Smith Associates 2001). If the project moves forward and is constructed, this highway, the Nablus-Jenin highway, will connect with the Al Badhan-Al Far'a-Tubas Road. The combination of the two projects will result in cumulative benefits to travel flow, safety, and economic development in the northern West Bank.

5.8 Irreversible and Irretrievable Commitment of Resources

Both the Proposed Action and Alternative 1 will involve an irretrievable commitment of labor, material, energy, and funds, in addition to the time spent in the design, construction, and maintenance of the proposed road. There would not be an irreversible commitment of resources with any alternative discussed herein.

SECTION 6

Mitigation & Monitoring Plan

The following mitigation procedures will be implemented during construction to minimize or eliminate impacts.

Issue	Mitigation
	<ul style="list-style-type: none"> ➤ Potentially hazardous materials (oil, grease, hydraulic fluid, battery acid, radiator fluid, etc.) will be disposed of in an environmentally friendly manner. Spilled materials will be contained and removed and will not be allowed to enter surface waters. ➤ Silt fence barriers will be used to contain and prevent silt from entering surface waters. Sediment control procedures will be closely adhered to. ➤ A temporary barrier will be installed in the Wadi Al Far'a to protect the Al Far'a stream, riparian vegetation, and the 15th century watermill from construction activities. Equipment, materials, and workers will not be allowed to disturb the stream or the vegetation along the stream. ➤ To protect the Al Far'a stream and vegetation in the wadi, equipment, materials, and workers will use the dirt road/path in the wadi those during construction and cleanup activities that must take place in the wadi. ➤ See Solid Waste Management for other mitigation protecting water quality.
Cultural Resources	<ul style="list-style-type: none"> ➤ All necessary precautions to protect and preserve cultural or archaeological resources will be taken within the construction zones. If archaeological resources are uncovered, construction shall cease immediately in the area until the Ministry of Tourism and Antiquities is contacted and the site is evaluated. ➤ In order to minimize the potential for loss or damage to cultural resources, the Contractor will alert workers about the possibility of unearthing archaeological artifacts and about punitive actions for theft or vandalism. Workers shall be required to stop all potentially damaging activities, notify the Contractor, and alert the Ministry of Tourism and Antiquities if they suspect cultural resources are being damaged. ➤ An exclusion zone will be established around the Tel Al Far'a earthen wall located on the side of the road. Excavation will not occur within the exclusion zone to protect the ancient wall. Outside of the exclusion zone near the Tel Al Far'a, excavation will be minimal (≤ 0.5 m) to protect the Tel. ➤ Improvements near the Tel Al Far'a will be closely coordinated with the Birzeit University cultural resources expert and will require his approval and concurrence. ➤ See Water Resources for other mitigation protecting the 15th century watermill. Equipment, materials, and personnel will not be allowed to disturb the watermill.
Natural Areas and Wildlife Habitat	<ul style="list-style-type: none"> ➤ Measures will be implemented to protect trees and avoid tree removal. ➤ See Solid Waste Management for other mitigation protecting natural areas and wildlife habitat. ➤ See Water Resources for other mitigation protecting the vegetation and wildlife habitat in the wadi.

Issue	Mitigation
Health and Safety	<ul style="list-style-type: none"> ➤ Safety Plans will be prepared for both public safety and worker safety. ➤ Traffic Plan will be prepared to minimize potential for accidents. ➤ Construction zones will be clearly defined with warning signs, pylons, fencing and ribbon barriers. ➤ Adequate hearing protection, hard hats, safety goggles, brightly colored vests and other appropriate safety equipment will be provided for workers.
Traffic	<ul style="list-style-type: none"> ➤ Preparation of a Traffic Plan with phasing for construction. ➤ Local authorities will be contacted and emergency routes for emergency vehicles will be maintained. ➤ Construction activities will be organized so that traffic disruptions and delays are minimized. ➤ Temporary alternative lanes and routes will be managed to allow traffic to pass through with minimal disruption. ➤ Flagmen will be provided to direct traffic and minimize conflicts.
Solid Waste Management	<ul style="list-style-type: none"> ➤ Construction spoil piles and waste material will be stored temporarily at designated protected areas an appropriate area from the Al Far'a stream. ➤ All waste material will be disposed of at designated disposal sites in an environmentally safe manner. The nearest controlled disposal site is in Einoun, just north of Tubas. ➤ Excavated material will be reused to the greatest extent possible.

SECTION 7**Conclusion**

This Environmental Assessment concludes that the Proposed Action is necessary to improve safety and efficient travel along Al Badhan-Al Far'a-Tubas Road. This action will also improve the natural and human environment by the removal of the trash/debris illegally dumped along the road. The Proposed Action will have no significant adverse social, economic, or environmental impacts at levels that would warrant an Environmental Impact Statement as long as Palestinian engineering practices, codes, and regulations are adhered to, and mitigation measures are implemented during construction. Unless significant impacts are identified as a result of agency review, this process will require no further environmental analysis.

SECTION 8

Consultations and List of Preparers

8.1 CONSULTATIONS

During the course of preparing the EA, the team members consulted with the following governmental and non-governmental agencies through the Public Scoping Meeting and individual consultations:

Governor of Jenin
 Palestinian Environmental Quality Authority
 Al Aqrabaniya Local Council
 Al Far'a Local Council
 Tubas Local Council
 Al Far'a Camp
 Yassed Local Council
 Tammun Local Council
 Talluza Local Council
 Ministry of Irrigation
 Ministry of Public Works and Housing
 Ministry of Transportation
 Ministry of Local Government
 Tubas Municipality
 Far'a Youth Center
 Joint Services Council
 Al Najah University
 Birzeit University

8.2 LIST OF PREPARERS

The following professionals were involved with the preparation of the EA.

Mission Environmental Officer	Anne Patterson, USAID
Chief Engineer	Anan Masri, USAID
Project Director	Hal McCabe, CH2M Hill
Project Manager	Chris McCormick, MWH
Environmental Team Leader	Shannon Donley, MWH
Public Outreach	Imad Nassar, CH2M Hill
<u>Subject Area Specialist</u>	
Cultural Landscape/Antiquities	Dr. Kamal Abdulfattah, Birzeit University
Archaeology	Mr. Ibrahim al-MaKhariza, Birzeit University
Geography	Mr. Abdulhalim al-Tumaizi, Birzeit University
Botany	Dr. Othman Sharkas, Birzeit University
Biology	Dr. Adima al-Sughayyan, Birzeit University

SECTION 9

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