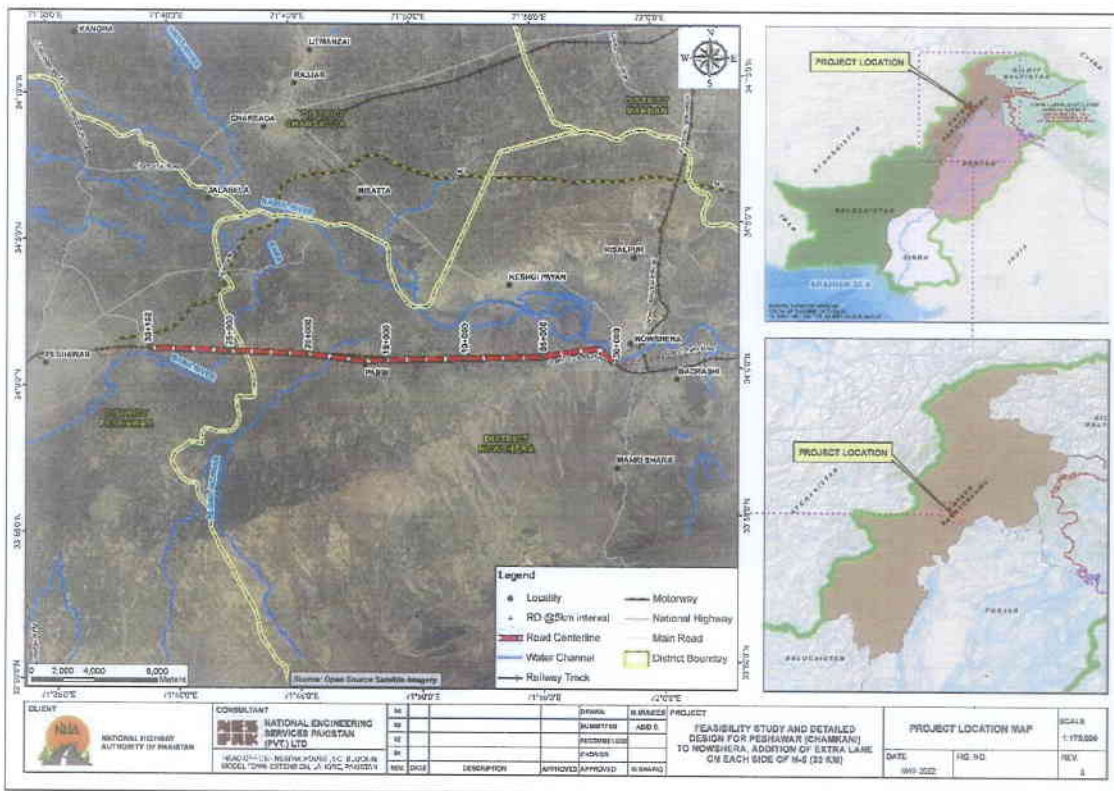




NATIONAL HIGHWAY AUTHORITY

CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED DESIGN FOR PESHAWAR (CHAMKANI) TO NOWSHERA, ADDITION OF EXTRA LANES ON EACH SIDE OF N-5 (32 KM)



ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT

JULY, 2022

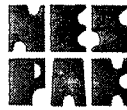


National Engineering Services Pakistan (Pvt) Limited
 Geotechnical & Geoenvironmental Engineering Division
 1C, Block N, Model Town Ext, Lahore 54700, Pakistan
 Phone: +92-42-99231917, 99090396 Fax: +92-42-99231950
 Email: geotech@nespak.com.pk Website: <http://www.nespak.com.pk>

Clearance Code	Doc. No.	4342-01	Rev. No.	00
----------------	----------	---------	----------	----



Consultant

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LIMITED
NESPAC House, 1-C, Block N, Model Town Ext, Lahore 54700, Pakistan

Phone: +92-42-99090000 Ext 200

Fax: +92-42-99231950

Email: geotech@nespak.com.pk, info@nespak.com.pk<http://www.nespak.com.pk>

Client



NATIONAL HIGHWAY AUTHORITY (NHA)

27 Mauve Area, G-9/1, Islamabad

Phone: +92-51-9260565

<http://www.nha.gov.pk>**Document Control**

Project		Consultancy Services for Feasibility Study and Detailed Design for Peshawar (Chamkani) To Nowshera, Addition of Extra Lanes on Each Side of N-5 (32 Km)						
Job / Proposal No.		4342		Division: Highway and Transportation				
Project Manager		Mr. Imran Shafique Butt (Principal Engineer)						
Specialty Group Leader(s)		GL (GT&GE): Engr. Muhammad Shariq Ahmed – Chief Engineer						
Title		Title of Document: Baseline Report						
Sub Title		Sr. No.	Sub Title Description					
		1.						
		2.						
		3.						
Document No.		4342-01		No. of Documents		01		
Clearance Code		4342/023/M/01(00X)						
Date of Issue		July 2022						
Document Location		GT&GE Document Library						
Rev No.	Date	Description	Prepared by		Checked by		Approved by HOD	
			Name	Signature	Name	Signature	Name	Signature
00	04-07-2022	1 st Draft	Mr. Hafiz Abid Saleem		Mr. M. Shariq Ahmed		Mr. Irfan-ul-Haq	
			Ms. Ramla Siddique		-		-	
			Mr. Ibadullah Khan					
			Mr. Kamran Ahmed		-		-	
			Mr. Muhammad Abdul Basit		-		-	
					-		-	
01								
02								



DISCLAIMER

This report has been prepared by Environment team of National Engineering Services Pakistan Pvt. Ltd (NESPAK) for National Highway Authority (NHA) for Feasibility Study and Detailed Design for Peshawar (Chamkani) to Nowshera, Addition of Extra Lanes on Each Side Of N-5 (32 Km). This report is based on the project information provided to NESPAK at the time of preparation of this report.

Any use, which a third party makes of this report, or any reliance on or decisions to be made based on it, is the responsibility of such party. NESPAK accepts no responsibility of any decision made by any third party on the basis of this report.

The information given in this report may change as a result of change in the design in future. Change in the design or other project details may require updation of this report. NESPAK does not accept any responsibility for the changes in the conditions/recommendations provided in this report due to change in design or the environmental factors.



ACKNOWLEDGEMENT

NESPAK wish to express their appreciation and gratitude for the co-operation, assistance and hospitality provided by Government and Non-Governmental Organizations (NGO's) and the locals and Provincial departments of Punjab and Khyber Pakhtunkhwa including but not limited to the National Highway Authority (NHA), Environmental Protection Departments, Forest, Wildlife, Irrigation, Agriculture, Social Welfare and other line Departments for the completion of this study.



**CONSULTANCY SERVICES FOR FEASIBILITY STUDY AND DETAILED DESIGN FOR
PESHAWAR (CHAMKANI) TO NOWSHERA, ADDITION OF EXTRA LANES ON EACH
SIDE OF N-5 (32 KM)**

ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT

TABLE OF CONTENTS

		<u>Page No.</u>
TABLE OF CONTENTS		iv
LIST OF TABLES		ix
LIST OF ABBREVIATIONS.....		xi
GLOSSARY		xiii
EXECUTIVE SUMMARY		ES-1
1	INTRODUCTION.....	1-1
1.1	GENERAL	1-1
1.2	PROJECT BACKGROUND.....	1-1
1.3	REQUIREMENT TO CONDUCT EIA.....	1-4
1.4	OBJECTIVE OF EIA	1-4
1.5	NATURE, SIZE, MAGNITUDE AND LOCATION OF THE PROJECT	1-5
1.6	PROJECT PROPONENT	1-5
1.7	CONSULTANT EIA TEAM.....	1-5
1.8	APPROACH AND METHODOLOGY	1-6
1.8.1	Literature Review	1-6
1.8.2	Review of Environmental Laws and Institutional Requirements.....	1-6
1.8.3	Delineation of Corridor of Impact (Col)	1-6
1.8.4	Survey of Col.....	1-1
1.8.5	Analysis of Alternatives	1-1
1.8.6	Environmental Baseline Survey of the Project.....	1-1
1.8.7	Stakeholder Consultations	1-2
1.8.8	Impact Assessment and Mitigation Measures	1-2
1.8.9	Environmental Management Plan (EMP).....	1-3
1.8.10	Conclusions and Recommendations	1-3
1.9	ORGANIZATION OF REPORT.....	1-3
2	POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORKS	2-1
2.1	GENERAL	2-1
2.2	CHECKLIST OF PROCEDURE FOR ENVIRONMENTAL ASSESSMENT	2-13
2.3	COMPLIANCE PROCEDURE FOR OBTAINING NOC FROM KPEPA.....	2-14
2.4	INTERNATIONAL PROTOCOL/CONVENTIONS.....	2-16
2.5	ADMINISTRATIVE FRAMEWORK.....	2-19
2.5.1	National Highway Authority (NHA).....	2-19
2.5.2	Environmental Protection Agency (EPA), Khyber Pakhtunkhwa.....	2-19
3	PROJECT DESCRIPTION.....	3-1
3.1	GENERAL	3-1
3.2	RATIONALE OF PROJECT	3-1
3.3	OBJECTIVES OF THE PROJECT.....	3-1
3.4	PROJECT BENEFITS.....	3-2
3.5	PROJECT ADMINISTRATIVE JURISDICTION.....	3-2



3.6	PROJECT LOCATION	3-2
3.7	COMPONENTS OF THE PROJECT	3-2
3.8	LAND ACQUISITION	3-2
3.9	ACCESSIBILITY OF THE PROJECT AREA	3-2
3.10	TRAFFIC STUDY	3-4
3.11	DESIGN ASPECT	3-7
3.11.1	Design Criteria.....	3-7
3.12	CONSTRUCTION ASPECTS	3-12
3.12.1	Construction Materials	3-12
3.12.2	Work Force.....	3-13
3.12.3	Construction Activities and Required Machinery	3-13
3.12.4	Construction Camps.....	3-14
3.12.5	Water Requirement.....	3-14
3.12.6	Wastewater Generation	3-15
3.12.7	Solid Waste Estimation	3-15
3.12.8	Power Requirement/ Power Source.....	3-15
3.13	PROJECT IMPLEMENTATION SCHEDULE.....	3-15
3.14	COST OF THE PROJECT	3-15
3.15	ALTERNATIVE ASSESSMENT	3-16
3.15.1	General.....	3-16
3.15.2	Alternative-I No Project Option.....	3-16
3.15.3	Alignment Alternatives	3-17
4	DESCRIPTION OF THE ENVIRONMENT.....	4-20
4.1	GENERAL	4-20
4.2	FIELD VISITS FOR BASELINE STUDY	4-20
4.3	PHYSICAL ENVIRONMENT	4-20
4.3.1	Topography	4-20
4.3.2	Regional Geology and Soil.....	4-21
4.3.3	Seismology.....	4-24
4.3.4	Climate	4-26
4.3.5	Temperature.....	4-26
4.3.6	Rainfall	4-27
4.3.7	Relative Humidity	4-28
4.3.8	Wind Speed.....	4-29
4.3.9	Surface water	4-30
4.3.10	Groundwater.....	4-33
4.3.11	Solid Waste and Wastewater Situation.....	4-33
4.3.12	Environmental Monitoring, Sampling and Testing for Proposed Project	4-33
4.3.13	Land use of the Proposed Project.....	4-36
4.3.14	Environmental Sensitive Receptor of the Proposed Project	4-36
4.4	ECOLOGICAL ENVIRONMENT	4-39
4.4.1	Methodology.....	4-39
4.4.2	Ecosystem and Floristic Composition of the Study Area	4-39
4.4.3	Natural Vegetation	4-40
4.4.4	Shrubs and Herbs	4-40
4.4.5	Fauna	4-40
4.4.6	Mammals.....	4-41
4.4.7	Reptiles	4-41
4.4.8	Amphibians.....	4-41
4.4.9	Avifauna	4-42
4.4.10	Endangered Fauna	4-42
4.4.11	Wetlands	4-42
4.4.12	Game Reserves/ Wildlife Sanctuaries/ National Parks	4-43
4.5	SOCIAL ENVIRONMENT	4-43
4.5.1	Administrative Setup of District Peshawar	4-43
4.5.2	Administrative Setup of District Nowshera	4-45
4.5.2.1	Population Communities and Employment.....	4-45
4.5.2.2	Transportation and Tourism.....	4-46



4.5.3	Socio Economic Characteristics.....	4-49
4.5.4	Demography of Survey Respondents.....	4-50
5	STAKEHOLDER CONSULTATION.....	5-1
5.1	GENERAL.....	5-1
5.2	OBJECTIVES.....	5-1
5.3	STAKEHOLDER IDENTIFICATION.....	5-2
5.3.1	Primary Stakeholders.....	5-2
5.3.2	Secondary Stakeholders.....	5-3
5.3.3	Divisional Level Stakeholders.....	5-3
5.3.4	Community Level Consultations.....	5-3
5.3.5	Consultations with Departments.....	5-3
5.3.6	Summary of the Consultations.....	5-4
5.4	COMMUNITY CONSULTATIONS.....	5-5
5.4.1	Methods of Community/Public Consultations.....	5-5
5.4.2	Locations of the Public Consultations and Participation.....	5-5
5.4.3	Findings of Community Consultations.....	5-5
5.5	GENERAL OPINION OF CONSULTED COMMUNITIES.....	5-7
5.6	STAKEHOLDER CONSULTATIONS FRAMEWORK FOR CONSTRUCTION AND OPERATION PHASE.....	5-7
5.7	GRIEVANCE REDRESS MECHANISM (GRM).....	5-9
5.7.1	Local/PIU Level GRM.....	5-9
5.7.2	Higher (PMU/EALS) Level GRM.....	5-10
5.7.3	Constitution and Function of the GRC.....	5-10
5.7.4	Information Dissemination and Community Outreach.....	5-11
6	ANTICIPATED IMPACTS AND MITIGATION MEASURES.....	6-1
6.1	GENERAL.....	6-1
6.2	NOTION OF SIGNIFICANCE.....	6-1
6.3	METHODOLOGY FOR IMPACT EVALUATION.....	6-2
6.4	DELINEATION OF PROJECT CORRIDOR OF IMPACT (COI).....	6-4
6.5	RIGHT OF WAY (ROW) / PROJECT AREA.....	6-4
6.6	POTENTIAL POSITIVE IMPACTS.....	6-4
6.7	POTENTIAL ADVERSE ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES.....	6-5
6.8	POTENTIAL ENVIRONMENTAL IMPACTS DURING PRE-CONSTRUCTION PHASE.....	6-5
6.8.1	Technical Design and Layout Planning.....	6-5
6.8.2	Topography.....	6-6
6.8.3	Drainage.....	6-6
6.8.4	Seismicity.....	6-6
6.8.5	Resource Conservation.....	6-7
6.8.6	Change in Hydrologic Regime.....	6-8
6.8.7	Flora.....	6-8
6.8.8	Fauna.....	6-8
6.8.9	Land Acquisition.....	6-9
6.8.10	Renting / Leasing Land.....	6-9
6.8.11	Physical, Religious and Cultural Resources.....	6-10
6.8.12	Public Utilities.....	6-10
6.9	ADVERSE IMPACTS DURING CONSTRUCTION STAGE.....	6-11
6.9.1	Traffic Issues.....	6-11
6.9.2	Resource Conservation.....	6-12
6.9.3	Soil Erosion and Contamination.....	6-13
6.9.4	Excavation of Earth.....	6-14
6.9.5	Air Quality.....	6-14
6.9.6	Noise and Vibration.....	6-15
6.9.7	Borrow Areas/ Open Pits.....	6-16
6.9.8	Construction Camps/Camp Sites.....	6-17
6.9.9	Wastewater Generation at Construction Camps.....	6-18
6.9.10	Solid Waste (Construction, Municipal and Hazardous Waste).....	6-19



6.9.11	Impact on Water Resources (Surface and Groundwater Contamination)	6-20
6.9.12	Waste Management from Asphalt and Batching Plants	6-22
6.9.13	Green House Gas (GHG) Abatement	6-22
6.9.14	Discovery of Heritage Sites and Structures during Excavation	6-23
6.9.15	Emergency Response	6-23
6.9.16	Disposal of Mucking Material	6-23
6.9.17	Natural and Man-Made Disasters	6-23
6.9.18	Community Health and Safety	6-24
6.9.19	Occupational Health and Safety	6-26
6.9.20	Flora	6-27
6.9.21	Fauna	6-28
6.9.22	Social and Cultural Conflicts	6-29
6.9.23	Community Disturbance	6-29
6.9.24	Communicable Diseases	6-30
6.9.25	Gender Issues	6-31
6.9.26	Impacts on Livelihood	6-33
6.9.27	Influx of Labor	6-33
6.9.28	Coronavirus Disease (COVID-19)	6-35
6.10	ANTICIPATED IMPACTS DURING OPERATIONAL PHASE	6-36
6.10.1	Landscape	6-36
6.10.2	Air Quality	6-36
6.10.3	Noise and Vibration	6-37
6.10.4	Road Safety	6-37
6.10.5	Drainage	6-38
6.10.6	Road Maintenance Works and Heavy Traffic	6-38
6.10.7	Flora	6-39
6.10.8	Fauna	6-39
6.10.9	Increase in Land Value	6-40
6.10.10	Decrease in Operating Cost of Vehicles	6-40
6.10.11	Economic Boost	6-40
6.10.12	Community Development	6-40
7	ENVIRONMENTAL MANAGEMENT PLAN	7-1
7.1	GENERAL	7-1
7.2	EMP COMPONENTS	7-1
7.3	EMP OBJECTIVES	7-1
7.4	SCOPE OF THE EMP	7-2
7.5	ENVIRONMENTAL POLICY, LEGISLATION AND FRAMEWORK	7-2
7.6	INSTITUTIONAL REQUIREMENTS	7-2
7.6.1	Institutional Arrangements for Implementation of EMP during Construction Phase	7-2
7.6.2	Overall Oversight Arrangements	7-3
7.6.3	Roles and Responsibilities	7-3
7.6.4	Monitoring and Evaluation Consultant	7-5
7.6.5	Institutional Arrangement for Implementation of EMP during O&M Phase	7-5
7.7	ENVIRONMENTAL MITIGATION AND MANAGEMENT MATRIX	7-6
7.8	ENVIRONMENTAL MONITORING PLAN	7-30
7.8.1	Checklists for Environmental Monitoring	7-30
7.8.2	Monitoring Strategy	7-30
7.9	PLANNING FOR EMP IMPLEMENTATION	7-0
7.9.1	NOC and Other Approvals	7-0
7.9.2	Stakeholder Coordination	7-0
7.10	TRAINING AND CAPACITY BUILDING	7-0
7.11	COMMUNICATION AND DOCUMENTATION	7-1
7.11.1	Data Recording and Maintenance	7-1
7.11.2	Database	7-1
7.11.3	Meetings and Reporting	7-2
7.11.4	Social Complaint Register	7-2
7.11.5	Photographic Records	7-2
7.11.6	Non-Compliance of the EMP	7-2



7.11.7	Review of Recorded Data	7-3
7.12	MANAGEMENT PLANS.....	7-3
7.12.1	Tree Plantation / Reforestation Plan	7-3
7.12.2	HSE Management Plan.....	7-4
7.12.3	Emergency Preparedness and Response Plan	7-5
7.12.4	Restoration and Rehabilitation Plan.....	7-5
7.12.5	Waste Management Plan.....	7-6
7.12.6	Disaster Management Plan.....	7-7
7.12.7	Drinking Water Supply and Sanitation Plan	7-7
7.12.8	Traffic Management Plan	7-7
7.13	CHANCE FIND PROCEDURE.....	7-8
7.14	QUARRY MANAGEMENT PLAN.....	7-8
7.15	RESOURCE CONSERVATION PLAN	7-8
7.16	CODES OF PRACTICE	7-8
7.16.1	General.....	7-8
7.16.2	Good Engineering Practices	7-9
7.16.3	Cultural Norms	7-9
7.17	PUBLIC DISCLOSURE.....	7-10
7.18	EMP COST.....	7-10
8	CONCLUSION AND RECOMMENDATIONS	8-1
8.1	CONCLUSIONS.....	8-1
8.2	RECOMMENDATIONS.....	8-2

ANNEXES

Annex-I:	Environmental Monitoring Report
Annex-II:	Land use Map in the Col and Row
Annex-III:	Sensitive Receptor Stretch Wise Maps
Annex-IV:	List of Participants of Focus Group Discussions
Annex-V:	Guideline for Contractor's TMP
Annex-VI:	Contractor's Occupational Health and Safety Plan
Annex-VII:	Quarry Management Plan
Annex-VIII:	Sanitation Plan
Annex-IX:	Chance Find Procedure
Annex-X:	Emergency Response Plan
Annex-XI:	Guidelines to Combat with Covid-19
Annex-XII:	Tree Plantation Plan
Annex-XIII:	Resource Conservation Plan



LIST OF TABLES

Table 1.1 : Team Composition for the EIA Study.....	1-6
Table 2.1: Main Strategies/Policies Related to Environment and Relevance to the Project	2-1
Table 2.2: Main Legislation/Acts Related to Environment and Their Relevance to the Project	2-7
Table 2.3: International Agreements/Conventions Relevant to the Project	2-16
Table 3.1: Total Projected Traffic Project.....	3-5
Table 3.2: Machinery and Equipment Requirement	3-14
Table 3.3: Technical Comparison of Option-I and Option-II	3-19
Table 4.1: Values of Seismic Zones of Pakistan.....	4-24
Table 4.2: Maximum and Minimum Average Temperature of Peshawar	4-26
Table 4.3: Mean Monthly Rainfall of Peshawar	4-27
Table 4.4: Relative Humidity Recorded at Peshawar Meteorological Gauging Station.....	4-28
Table 4.5: Wind Speed Recorded at Peshawar Station	4-29
Table 4.6: Environmental Monitoring, Sampling and Testing Points	4-33
Table 4.7: Summary of Landuse in the Col	4-36
Table 4.8: List of Flora Found in the Project & study area Area	4-40
Table 4.9: Faunal Species in the Study Area.....	4-41
Table 4.10: Reptiles in the Study Area	4-41
Table 4.11: Amphibian Species in the Study Area	4-42
Table 4.12: Avifauna in the Study Area	4-42
Table 4.13: Number of Respondents of Project Area	4-49
Table 4.14: Age group of Respondents	4-51
Table 4.15: Educational Level of Respondents	4-51
Table 4.16: Source of Income of Respondents	4-52
Table 4.17: Average Monthly Income of Respondents	4-52
Table 4.18: Average Monthly Income of Respondents	4-53
Table 4.19: Ownership Status of the Houses of Respondents	4-53
Table 4.20: Type of the Houses of Respondents	4-54
Table 4.21: Borrowing Status of Respondents	4-54
Table 4.22: Source of Drinking Water of Respondents	4-55
Table 4.23: Satisfaction Level of Water Quality of Respondents.....	4-55
Table 4.24: Mode of Transport.....	4-56
Table 4.25: Access to Social Amenities in the Project Area	4-56
Table 4.26: Women Participation in the Various Activities	4-57
Table 5.1: Suggested Tasks and Purposes of Consultations	5-1
Table 5.2: Summary of Departmental Consultations	5-1
Table 5.3: Locations of Consultations and Number of Participants	5-5
Table 5.4: Concerns and Responses during Public Consultation with Stakeholders	5-6
Table 5.5: Future Consultations Framework.....	5-8
Table 6.1: Project Impact Matrix	6-3
Table 6.4: Estimated Wastewater Generated by Workers in Construction Camps	6-18
Table 7.1: Environmental Mitigation and Management Matrix.....	7-7
Table 7.2: Environmental Monitoring Plan	7-31
Table 7.3: Periodic Reporting Mechanism	7-2
Table 7.4: Break-up for Personal Protective Equipment cost.....	7-10
Table 7.5: Environmental Management and Monitoring Cost Estimate	7-11



LIST OF FIGURES

Figure 1.1: Project Location Map	1-3
Figure 1.2 : Index RoW and Col of the Proposed Project.....	1-0
Figure 2.1: Procedure for Submitting the EA Report	2-15
Figure 3.1: Project Area Accessibility Map	3-3
Figure 3.2: Cross Section of Rehabilitation of Existing Road	3-8
Figure 3.3: Rehabilitation of Existing Road Cross section at U-turn.....	3-9
Figure 3.4: Rehabilitation of Existing Road Cross section at Urban Area	3-10
Figure 3.5: Rehabilitation of Existing Road Cross section at Flyover	3-11
Figure 4.1: Topography of the Project Area.....	4-22
Figure 4.2: Regional Geological Map.....	4-23
Figure 4.3: Seismic Zoning Map	4-25
Figure 4.4: Mean Monthly Temperature at Peshawar Meteorological Gauging Station.....	4-27
Figure 4.5: No of Rainy Days & Mean Monthly Rainfall of Peshawar	4-28
Figure 4.6: Relative Humidity of Peshawar Meteorological Gauging Station	4-29
Figure 4.7: Wind Speed of Peshawar Meteorological Gauging Station.....	4-30
Figure 4.8: Surface Hydrological Map:.....	4-32
Figure 4.9: Environmental Monitoring & Sampling Points Location Map.....	4-35
Figure 4.10: Index Land use Map	4-37
Figure 4.11: Index Environmental Sensitive Receptors Map::	4-38
Figure 4.12: Settlement Map :	4-48
Figure 5.1: Grievance Resolution Flow Mechanism with Time Frame	5-12
Figure 6.1: General Drawing of Septic Tank.....	6-19
Figure 7.1: Organizational Setup for Implementation of EMP at Construction Phase.....	7-3



LIST OF ABBREVIATIONS

AASHTO	American Association of State Highway and Transportation Officials
APs	Affected Persons
BCP	Building Code of Pakistan
BRT	Bus Rapid Transit
CBD	Convention on the Biological Diversity
CC	Construction Contractor
CCI	Council of Common Interest
CCMP	Construction Camp Management Plan
CDA	Canal and Drainage Act
CDM	Clean Development Mechanisms
CITES	Convention on the International Trade of Endangered Species
CMH	Combined Military Hospital
CSC	Construction Supervision Consultant
Col	Corridor of Impact
COVID-19	Coronavirus disease
DCR	District Census Report
DFO	Divisional Forest Officer
ECO	Economic Cooperation Organization
EIA	Environmental Impact Assessments
EMMM	Environmental Mitigation and Management Matrix
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
EPD	Environmental Protection Department
FAO	Food and Agriculture Organization
GER	Gross Enrollment Rate
GHG	Global Greenhouse Gas
GoP	Government of Pakistan
GRC	Grievances Redressal Committee
GRM	Grievance Redress Mechanism
GT	Grand Trunk
HSE	Health, Safety and Environment
IEE	Initial Environmental Examination
ILO	International Labour Organization
LAA	Land Acquisition Act
MSDS	Material Safety Data Sheets
MDGs	Millennium Development Goals
MGD	Million Gallons per Day
NCS	National Conservation Strategy
NDMA	National Disaster Management Act
NEE&C	National Energy Efficiency and Conservation Bill
NER	Net Enrollment Rate
NHA	National Highway Authority
NESPAK	National Engineering Services Pakistan
NGO's	Non-Governmental Organizations
NOC	No Objection Certificate



NPO	No Project Option
NPZ	Noise Perimeter Zones
N-5	National Highway 5
O&M	Operation and Maintenance
OIC	Organization of the Islamic Conference
PD	Project Director
PDMA	Provincial Disaster Management Authorities
PNCS	Pakistan National Conservation Strategy
SC	Supervision Consultant
KPEPA	Khyber Pakhtunkhwa Environmental Protection Agency
PGA	Peak Ground Acceleration
PI	Public Involvement
NEQS	National Environmental Quality Standards
PMD	Pakistan meteorological department
PMU	Project Management Unit
POPs	Persistent Organic Pollutants
PPE	Personnel Protective Equipment
PSHA	Probabilistic Seismic Hazard Assessment
RAP	Resettlement Action Plan
ROW	Right of Way
SAARC	South Asian Association for Regional Cooperation
SC	Supervisory Consultant
SOP	Standard Operating Procedures
SSEMP	Site Specific EMP
STDs	Sexually-Transmitted Disease
TMP	Traffic Management Plan
ToR	Terms of Reference
UBC	Uniform Building Code
UNCCD	UN Convention to Combat Desertification
UNO	United Nations Organization



GLOSSARY

Air Quality Sensitive Receptors	People, property, species or designated sites for nature conservation that may be at risk from exposure to air pollutants potentially arising as a result of a proposed development.
Air Quality Standard	Air quality limiting values and objectives.
Annual Average Rainfall	Average amount of precipitation falling at a specified site recorded by the Meteorological Office. It gives a measure of the overall wetness of the local climate.
Baseline	Existing environmental conditions present on, or near a site, against which future changes can be measured or predicted.
Biodiversity	The variety of life in the world or in a particular habitat or ecosystem.
Climate	The climate can be described simply as the 'average weather', typically looked at over a period of 30 years. It can include temperature, rainfall, snow cover, or any other weather characteristic.
Climate Change	A change in the state of the climate, which can be identified by changes in average climate characteristics that persist for an extended period -typically decades or longer.
Cutting	A linear excavation of soil or rock to make way for a new railway or road. Cuttings help reduce the noise and/or visual impact of passing trains or road vehicles.
Decibel(S)	A unit used to express relative differences in sound power or intensity. There is a million to one ratio in sound pressure (measured in Pascal (Pa)) between the quietest audible sound and the loudest tolerable sound. The decibel (dB) scale, based on a logarithmic ratio, is used in sound measurement because of this wide range. Audibility of sound covers a range of approximately 0-140dB.
Dust	All airborne particulate matter.
Earthworks	The removal or placement of soils and rocks such as in cuttings, embankments and environmental mitigation, including the in-situ improvement of soils/rocks to achieve desired properties.
Ecosystem	A biological community of interacting organisms (e.g. plants and animals) and their environment.
Effect	Used throughout this environmental impact assessment report to refer to the consequence of an impact to the receiving environment (see also: 'impact').
Effluent	Liquid waste or sewage.
Embankment	Artificially raised ground, commonly made of rock or compacted soil, on which a new railway or road is constructed.



Environment Agency	Government agency established to protect and improve the environment and contribute to sustainable development. Responsibilities include: water quality and resources, flooding and coastal risk management and contaminated land.
Environmental Impact Assessment	A process of systematically assessing the likely environmental effects of proposed development projects. EIA is a legal requirement for certain public and private projects under Khyber Pakhtunkhwa Environmental Protection Act, 2014.
Environmental Impact Assessment Report	A suite of documents, previously referred to as an environmental statement, produced as part of an environmental impact assessment. It must include all information that is reasonably required to assess the likely significant environmental effects of a proposed development.
Excavated Material	Soil, rock and other material that has been removed from the ground during construction.
Greenhouse Gas	A gas such as carbon dioxide, methane, chlorofluorocarbons, nitrous oxide, ozone, and water vapor that contributes to the greenhouse effect by absorbing infrared radiation.
Groundwater	All water that is below the surface of the ground and within the permanently saturated zone.
Groundwater Body	A distinct volume of groundwater within an aquifer.
Heavy Metals	A loosely defined term which refers to a group of metal and metalloids, many of which are toxic to some degree.
Impact	Used throughout this EIA Report to refer to changes to the environment that have the potential to occur as a result of the construction and/or operation of the Proposed Scheme. (See also: 'effect'.)
Mitigation	The measures put forward to prevent, reduce and where possible, offset any adverse effects on the environment.
Risk Assessment	An assessment of the probability of a hazard occurring that could result in an impact.
Sand	Soil particles from 0.06mm-2.0mm in equivalent diameter. Fine sand particles are from 0.06mm-0.2mm; medium sand from 0.2mm-0.6mm; and coarse sand from 0.6mm-2.0mm.
Scoping	An initial stage in the environmental impact assessment process to determine the nature and potential scale of environmental effects arising as a result of a proposed development, and an assessment of what further studies are required to establish their potential environmental impacts and effects.
Screening	The first stage in an environmental impact assessment. It is used to determine if further assessment is necessary and to categorize the project.
Soil Erosion	The detachment and movement of soil by the action of water and/or wind.
Soil Profile	A vertical cross-section through a soil.
Surface Water	Waters including rivers, lakes, reservoirs, canals, streams, ditches, coastal waters and estuaries.



Threshold	A level of effect above which an assessment will be taken of whether any changes to procedures need to be made.
Topography	The natural or artificial features, level and surface form of the ground surface.
Topsoil	Upper layer of a soil profile, usually darker in color (because of its higher content of organic matter) and more fertile than subsoil, and which is a product of natural biological and environmental processes.



EXECUTIVE SUMMARY

ES-1 INTRODUCTION

Pakistan is experiencing inadequate transportation system since a few years. Currently, a lot of Motorways have been constructed as well as the network of National/ Provincial Highways have been improved and a lot of such projects are underway. To ensure traffic safety, it is mandatory for NHA to resolve issues of points locations where safety hazards, congestion and accident ratio is at high risk.

Chamkani – Nowshera section of N-5 has become a point of congestion with slower speed, longer trip times and increased vehicular queuing due to very dense urbanization in this area along N-5 especially at the locations of Pabbi, Tarru Jabba and Amangarh. The traffic of Nowshera-Chitral road (N-45) also uses Nowshera Chamkani Section of N-5. After the launch of CPEC project, Rashakai town of Nowshera is now economic Zone of Khyber Pakhtunkhwa (KP) which has also drawn traffic.

National Highway Authority (NHA) intends to provide additional lanes on each side of N-5 (32 Km approximately) between Chamkani to Nowshera which will eliminate traffic problem, allow smooth traffic flow, reduce accidents, time saving and improved operating cost.

M/s NESPAK (Pvt) Ltd. in JV with M/s New Vision Engineering Consultant and M/s AAN Consulting Engineers has been awarded the contract through open competition of consultancy services for feasibility study and detailed design of the project. In light of the consultant's scope preparation of Environmental Impact Assessment (EIA) study is one of the key tasks. This EIA report has been prepared for the proposed Chamkani-Nowshera Section of N-5 Road to fulfil the requirements of the Khyber Pakhtunkhwa Environmental Protection Agency (KPEPA)

Khyber Pakhtunkhwa Environmental Assessment Rules, 2021, provides screening categories of projects for which IEE or EIA need to be conducted. The proposed Project falls under the Category 'D' of "Transport" of the Schedule II. This category requires an EIA study to be conducted to initiate the process of environmental approval. Thus, to fulfill the requirements, an EIA Study has been prepared for the proposed Project.

The prime objective of the EIA study is to fully meet the statutory requirements set forth by the Khyber Pakhtunkhwa Environmental Protection Act, 2014.

ES-2 POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORKS

The Government of Pakistan (GOP) has promulgated laws/acts, regulations and standards for the protection, conservation, rehabilitation and improvement of the environment. Relevant National laws and regulations include Pakistan Environment Protection Act 1997, Guidelines for Environmental Assessment, Pakistan EPA. National Environmental Quality Standards (NEQS); National Conservation Strategy (NCS) ,1992; Land Acquisition Act (LAA), 1894 including later amendments; Protection of Trees and Brushwood Act, 1949, The Forest Act



(1927) including later amendment; Employment of Child Act, 1991. Applicable provincial laws and policies include Khyber Pakhtunkhwa Environmental Protection Act, 2014. Khyber Pakhtunkhwa Environmental Assessment Rules, 2021; KP wildlife and biodiversity act, 2015; Climate change policy, KP, 2016. Applicable international conventions and treaties referred in this report include Convention on Biological Diversity, 1997, The Convention on Conservation of Migratory Species of Wild Animals, (1981), Convention on International Trade in Endangered Species of Wild Fauna and Flora, (1973), United Nations Framework Convention on Climate Change, (1994), Sustainable Development Goals (SDGs).

NHA will be responsible for the implementation of project through Project Management Unit (PMU) whereas, KPEPA will be responsible for issuing environmental approval.

ES-3 PROJECT DESCRIPTION

One of the major sections on National Highway (N-5) where traffic congestion exists due to all type of traffic is between Peshawar (Chamkani) to Nowshera. North bound traffic from the southern Pakistan traversing on National Highway (N-5) passes through major cities crosses Chamkani which is located alongside N-5 at about 82 mi (or 133 km) west of Islamabad. After traversing through small towns like Taru Jabba, Pabbi and Amangarh, N-5 crosses Nowshera which is located on N-45. In recent years, Stretch of the N-5 between the cities of Chamkani and Nowshera has shown lot of urban development on both sides of N-5, that's why traffic remains jammed for hours in peak hours. Therefore, Chamkani- Nowshera section of N-5 has become a point of congestion with slower speeds, longer trip times, and increased vehicular queuing due to very dense urbanization in this area along N-5 especially at the locations of Pabbi, Tarru jabba and Amangarh. As demand has approached capacity, NHA Intends to provide additional lanes on each side of N-5 (32 Km approximately) between these two cities which will eliminate traffic problem, allow smooth traffic flow, reduce accidents, time saving and improved operating cost.

The proposed Project involves the addition of extra lane of 3.65 m on each sides of the Chamkani-Nowshera Section of N-5 road. It also involves the extension of existing structures which contain all the bridges, culverts, flyover and relocation of existing drains and existing utilities

No land acquisition is required as the proposed lane of 3.65 m on each side of the road will be added within the existing RoW of proposed Project. The proposed Project is expected to be completed within Two (02) years. Total cost of the Project is estimated to be around 10,819 Million PKR.

ES-4 DESCRIPTION OF THE ENVIRONMENT

Considering the potential impacts of the proposed Project, existing baseline environmental conditions of the proposed Project's Corridor of Impact (CoI) has to be used as a benchmark for comparison of the physical, ecological and socio-economic conditions before and after construction phases of the Project. This baseline will also provide the datum for assessing the impacts and suggesting the mitigation measures, which will be implemented effectively at various phases of the project activities.



The data presented in the forthcoming sections has been collected from the primary and secondary sources.

PHYSICAL ENVIRONMENT

The data presented in the forthcoming sections has been collected from the primary and secondary sources. For primary data acquisition, the Environment and Social team conducted the field visit during the month of May 2022.

The Project is located in Peshawar and Nowshera Districts. Peshawar is situated near the eastern end of the Khyber Pass and sits mainly on the Iranian plateau along with the rest of the Khyber-Pakhtunkhwa. The Vale of Peshawar is covered with consolidated deposits of silt, sands and gravel of recent geological times. While Nowshera district lies in border with Peshawar valley at an elevation of 295 m amsl. It is largely barren with distant range of mountains in the background. Spin Khak is a Barani area where soil is prevalently sandy with gravel with clay on top. This makes it very suitable for ground water retention

The proposed Project area comprises of unconsolidated surficial deposits of silt, sand and gravels. Based on detailed geotechnical investigations, it has been assessed that the ground comprises of Clay (Stiff to Very Stiff to Hard Silty) with Gravels/Lean Clay/Sandy Lean Clay with Gravels/Sandy Silt up to a depth of 18 meters underlain by Medium Dense to Dense to Very Dense Silty Sand/Poorly Graded Sand with Silt/Poorly Graded Sand up to maximum investigated depth of 25.0 meters below existing ground level (EGL).

As per Building Code of Pakistan (BCP), 2007 (Seismic Provisions), the project area falls entirely in the zone-2B (Moderate Hazard) category with PGA 0.16 to 0.24g. The Project Area has a hot semi-arid steppe climate which is very dry with little rainfall. It can rain at any time of the year but the rain does not last long. As well as being arid, the climate is extremely hot in the summer but slightly cooler in the winter months. There is no monsoon period. Throughout the year, temperatures fall dramatically at night, sometimes by as much as 20°C.

In District Peshawar and Nowshera, there are open water channels for storm water and sewerage. The waste water from commercial and residential areas disposed into these open drains which then merges into Kabul River.

Environmental monitoring of air quality, noise level, drinking water and surface/wastewater was conducted. Three (03) surface water/ wastewater and three (03) drinking water/groundwater samples were collected. Similarly, three (03) points were selected for ambient air and background noise monitoring at site. All the parameters of ambient air quality, noise levels, drinking water and waste water are well within the NEQS applicable limiting values. All parameters are within prescribed limits of Food and Agriculture Organization (FAO) except Chloride for surface water.

The sensitive receptors identified for the proposed Project within or near the Col are mosques, hospitals, schools, colleges and graveyards. etc.



ECOLOGICAL ENVIRONMENT

Flora: The Study Area is situated in semi-arid region of Pakistan. The region is characterized by dry climate both in summer and winter season. Forest found in the region is Tropical thorn forests. These are low, open and pronouncedly xerophytic forests in which thorny leguminous species predominate. The major tree species are *Prosopis cineraria* (Jhand), *Capparis decidua* (Karir, Karil), *Zizyphus mauritiana* (Ber), *Tamarix aphylla* (Farash) and *Kikar* (*Acacia nilotica*). Vegetation of the area shows that it is suitable for plantation of native species along the agriculture fields and road side. Natural vegetation including Karir (*Capparis aphylla*), Aak (*Calotropis procera*), Kana (*Saccharum bengalensis*), Khabbal (*Cynodon dactylon*), Lamb (*Aristida depressa*), Gorkha (*Lasiurus indicus*) is present only in the graveyards or at open areas along the existing roads and canals. The project area is populated mostly by Eucalyptus (*Eucalyptus camaldulensis*) along with some other species including Mulberry (*Morus alba*), Shisham (*Dalbergia sisso*), Ber (*Zizyphus mauritiana*), Kikar (*Acacia nilotica*) etc.

Fauna: The project area is rich in Natural fauna and especially the avi-fauna is well diversified and colorful. Mammals of the tract dominant by jackal, porcupine, squirrel and mongoose. The most common reptile that is worth mentioning and is occasionally witnessed are Brown Cobram Indian Krait, Spiny tailed Lizard and Fringed Toed Lizard. A fairly not diverse range of bird species is found living in some of suitable areas of the proposed site, including common species such as the dove, common myna, tree pie, crow, and sparrow. Rarely seen birds of prey include the common pariah kite is rare. There are no endangered species of fauna in the tract. There are no designated wetlands in falling in the project area. There is no Game Reserve, Reserve Forests and wild sanctuaries reported in the project alignment.

SOCIO-ECONOMIC ENVIRONMENT

The proposed Project area falls in the administrative jurisdiction of Chamkani and Nowshera districts. Under the latest revision of Pakistan's administrative structure, promulgated in 2001, Peshawar was given the status of a City district, and divided into four towns. Each town in turn consists of a number of union councils. There are a total of 92 union councils in district Peshawar. The city's annual growth rate is estimated at 3.99% per year, and the population of Peshawar district is 4,269,079 according to the 2017 census, Peshawar is the sixth-largest city of Pakistan. Most of the families are living in joint family system. Due to joint family system, the family size is large. Over 99% of the city's population is Muslim. Peshawar is one of the most ancient cities of this region and for centuries has been a center of trade between Afghanistan, South Asia, and Central Asia as well as the Middle East. It is a conservative Islamic city with a rich history. Peshawar's inhabitants consist mainly of Pashtun and Hindkowans. In addition, many Punjabis, Chitralis, Tajiks, Uzbeks and Hazaras can be found in the city. Though Pashto followed by Hindko is the main language spoken in the district, other languages such as Urdu, Persian, Saraiki and Punjabi are also spoken by some of the residents of the district. During the baseline survey 82 respondents were interviewed comprising 100% males due to some traditional restrictions in the project area. Based on sample survey 62% of the respondent population was illiterate and 38% was literate. The



sample survey also revealed that the majority of the respondents 55% were engaged in daily wages labor followed by 30% engaged in business / Shop keeping. However, 4% and 11% were associated with private jobs and profession of drivers on public transport respectively. It was also observed that majority of the respondents i.e. 61% were earning up to 25,000 per month, whereas 27% were earning between the ranges of 25,001 to 35,000 per month and 6% respondents were earning between 35,001 to 45,000 per month. However, 6% of the respondents were earning above 45,000 per month.

ES-5 STAKEHOLDER CONSULTATION

A series of public consultations were held to get the feedback/concerns of the different category of stakeholders including, district level departments, potential PAPs, local community and other general public residing in the Study Area. Consultation process includes focus group discussion, village/Town meetings and semi-structured interviews with Forest, Wildlife, Irrigation, Environment Protection and Social Welfare departments.

ES-6 ANTICIPATED PROJECT IMPACTS AND MITIGATION MEASURES

Significant efforts were made to identify the main physical, ecological, social, cultural and environmental issues related to the construction and operation of the proposed Project. The positive impacts due to the proposed Project are: The proposed Project shall provide a smooth flow of traffic, saving of vehicle travel time and vehicle operating costs of commuters. Reduction in traffic accidents and casualties by traffic congestions, Efficient movement of trade, goods and traffic in relatively shorter time, Quicker transports of agricultural products including perishable goods to final destination, Reduction in the fuel consumption and transportation cost caused by traffic congestion and bumpy roads, Reduction in air emissions from vehicular exhaust especially in case of traffic congestion and Increase in economic growth by providing employment opportunities to the local residents and vendors.

Apart from positive impacts, the adverse impacts and their mitigations during the construction and operation phases are briefly discussed below:

- Excessive water consumption by the construction staff may stress water resources in the project area and in certain cases may disturb the existing water supplies in the project area. Use potable water bowsers for construction works and mineral water bottles/ ground water for drinking purpose. Reduction of wastage of water through training of workers involved in water use;
- Construction activities and vehicular movement at construction sites may result in roadside accidents particularly inflicting local communities. Proposed Project will also have potential of air (dust pollution), noise and vibrational impacts on nearby community. There will be proper control on construction activities and oil spillage leakage of vehicles. The labourers with different transmittable diseases will be restricted within the construction site. Ensure that the site is restricted for the entry of irrelevant people particularly children. Efforts will be made to create awareness about road safety among the drivers operating construction vehicles;



- Wastewater will be generated at the construction camps and from construction activities. If the generated wastewater is not properly treated or disposed of, this may contaminate the surface water sources such as nullahs, drains, water channels etc. The wastewater generation is estimated to be 3,200 liters/day for 100 construction workers for the proposed Project. Domestic and chemical effluents from the construction camp will be disposed by the development of on-site sanitation systems i.e. septic tanks. Proper monitoring to check the compliance of NEQS will be carried out; and Sewage from construction camps will be disposed of after proper pre-treatment and processes such as soakage pit;
- Considering the labourers (about 100 in numbers) residing in the construction camp and the locally available labour, an average solid waste generation rate of 0.5 kg/capita/day is adopted for the estimation of solid waste generation. Based on this assumption, a total of about 50 kg of solid waste will be generated from construction camps on daily basis. All the solid waste from the camps will be properly collected at source by placing containers and disposed of through proper solid waste management system. The Contractor will coordinate with local representatives and administration of the concerned solid waste management department for the disposal of solid waste. Surface water might get contaminated due to the disposal of construction waste generated due to the Project activity and also result in jeopardizing the health of natives that use this water for meeting domestic requirement. Construction camps will be established in areas with adequate natural drainage channels in order to facilitate the flow of the treated effluents after ensuring that NEQS are met; the surface and groundwater reserves will be adequately protected by installing screens and barriers to protect the source of contamination such as construction and oily waste that will degrade its potable quality;
- Air quality will be affected by fugitive dust emissions from construction machinery; dust from the unpaved surface and construction vehicles. Emissions from batching / asphalt plants can be controlled efficiently by the installation of cyclone / scrubbers. Diesel operated equipment should be equipped with well-maintained fuel filter and may be replaced timely (if required). In addition to that, regular maintenance activities comprising changing of lubricating oil, changing the air and fuel filter, cleaning the fuel system, draining the water separators and proper tuning may also help in reducing the emissions from diesel generators. Construction materials (sand, gravel, and rocks) and spoil materials will be transported trucks covered with tarpaulins and all vehicles (e.g., trucks, equipment, and other vehicles that support construction works) will comply with the NEQS for carbon emissions and noise; Regular water sprinkling of the site should be carried out to suppress excessive dust emission(s);
- The project will involve destruction of vegetation cover on construction areas particularly along proposed road construction. It is initially examined that approximately 3430 mature, sub-mature, pole crop and saplings of different tree/plants species may be removed during the construction phase of the project. A tree plantation program shall be formulated with the recommendations and technical support of concerned Forest Department. Plan for compensatory planting for ten (10)



trees against each fallen tree of similar floral function at the available spaces in/around the project area has been proposed;

- During construction phase the existing population of mammals and reptiles of the construction areas will be affected due to disturbance arising from construction activities involving excavation, movement of machinery and vehicular traffic, movement of labor, camping, etc. Care shall be taken during construction activities for avoiding purposely or chance killing of animals. If found any wild species and habitat during constructing that must be dealt carefully and local wildlife department officials should be called. Hunting, poaching and harassing of wild animals shall be strictly prohibited, and contractor shall be required to instruct and supervise its labor force accordingly and clear orders should be given in this regard;
- During construction there will be a number of activities which, if not mitigated, are likely to cause disturbance to communities in the project area; these are: Increased traffic on public routes; health and safety risk will also be posed to the community due to the existence of a construction site(s) and the storage and use of hazardous chemicals; and movement of plant and vehicles throughout the project area, especially along haulage routes passing alongside private land during disrupting local movement and posing traffic safety issues. Maintaining regular communication with local communities and other stakeholders to minimize tensions arising from Project activities; Maintaining a grievance procedure to facilitate stakeholders in expressing concerns; Proper traffic diversion plans before the start of the construction; Proposal of pedestrian bridge for the locals; Appropriate budget for traffic/safety sign boards; and Timely completion of the project; and
- Increased traffic levels may lead to higher values of emissions. PMU-NHA with the help of KPEPA may set up system to monitor air quality along project area in accordance with NEQS for a specific period to record the quality of air during the operation phase;

ES-7 ENVIRONMENTAL MANAGEMENT PLAN (EMP)

The EMP of the proposed Project mainly comprises Institutional Requirements; Environmental Mitigation and Management Matrix (EMMM); Environmental Monitoring Plan; Planning for EMP Implementation; Training and Capacity Building; Communication & Documentation; Management plans and EMP cost. PMU-NHA will be responsible for overall project implementation and implementation of EMP of the proposed Project during construction and operational phase. The total cost required to effectively implement the mitigation measures is approximately Rs. 97/- Million which includes cost of training, environmental monitoring, tree plantation and Health and Safety etc. during construction and operational phase. The EMP will be part of the contract document the Contractor.

ES-8 CONCLUSION AND RECOMMENDATIONS



This report has been prepared in accordance with the requirements of the Khyber Pakhtunkhwa Environmental Protection Act, 2014. Khyber Pakhtunkhwa Environmental Assessment Rules, 2021, provides screening categories of projects for which IEE or EIA need to be conducted. The proposed Project falls under the Category 'D' of "Transport" of the Schedule II. This category requires an EIA study to be conducted to initiate the process of environmental approval. Thus, to fulfill the requirements, an EIA Study has been prepared for the proposed Project.

Project is socio-economically viable and environment friendly if EMP is implemented in true letter and spirit. Results of the EIA Study have shown that the impacts of the project activity on most of the physical environment will be negligible. However, there will be significant impacts on the ecological and social environment. These impacts could be reduced by proper and judicious compensation to the affectees and well planned meticulous design of the facility and by implementing an appropriate tree plantation plan. An EMP for both the phases (construction and operation) has been developed as part of the report which provides a detailed mitigation matrix that covers impacts, mitigation measures roles and responsibilities and timings to avoid, minimize or mitigate the adverse impacts of the project.

The EMP, its mitigation and monitoring programs, contained herewith will be included within the Bidding documents for project works for all Project components. The Bidding documents state that the Contractor will be responsible for the implementation of the requirements of the EMP through his own SSEMP which will adopt all of the conditions of the EMP. This ensures that all potential bidders are aware of the environmental requirements of the Project and its associated environmental costs.

The EMP and all its requirements will then be added to the Contractors Contract, thereby making implementation of the EMP a legal requirement according to the Contract



1 INTRODUCTION

1.1 GENERAL

National Highway Authority (NHA) intends to provide additional lanes on each side of N-5 (32 Km approximately) between Chamkani to Nowshera which will eliminate traffic problem, allow smooth traffic flow, reduce accidents, save time and reduce operating cost.

1.2 PROJECT BACKGROUND

Pakistan is experiencing inadequate transportation system since a few years. Currently, lot of Motorways have been constructed as well as the network of National/Provincial Highways have been improved and lot of such project are underway. To ensure traffic safety, it is mandatory for NHA to resolve issues of points locations where safety hazards, congestion and accident ratio is at high risk.

National Highway 5, or N-5, is Pakistan's longest highway running from the port city of Karachi to the border crossing at Torkham. It runs north from Karachi located in Sindh province to Hyderabad, Moro and Khairpur before crossing into Punjab province where it passes through Multan, Sahiwal, Lahore, Sheikhupura District, Gujranwala, Gujrat, Jhelum and Rawalpindi. At Rawalpindi, it turns eastwards and passes through Attock Khurd before crossing the Indus River into Khyber Pakhtunkhwa to continue through Nowshera and Peshawar before entering the Khyber Pass and reaching the border town of Torkham. All the major cities contribute in feeding regular and freight traffic on this highway. One of the major sections on National Highway (N-5) where traffic congestion exists due to all type of traffic is between Peshawar (Chamkani) to Nowshera. North bound traffic from the southern Pakistan traversing on National Highway (N-5) passes through major cities crosses Chamkani which is located alongside N-5 at about 82 mi (or 133 km) west of Islamabad. After traversing through small towns like Taru Jabba, Pabbi and Amangarh, N-5 crosses Nowshera which is located on N-45. In recent years, Stretch of the N-5 between the cities of Chamkani and Nowshera has shown lot of urban development on both sides of N-5, that's why traffic remains jammed for hours in peak hours. As traffic capacity of Chamkani to Nowshera section of N-5 has fallen shor, due to which there is need to provide additional lanes on each side of N-5 (32 km approximately) between these two (02) cities.

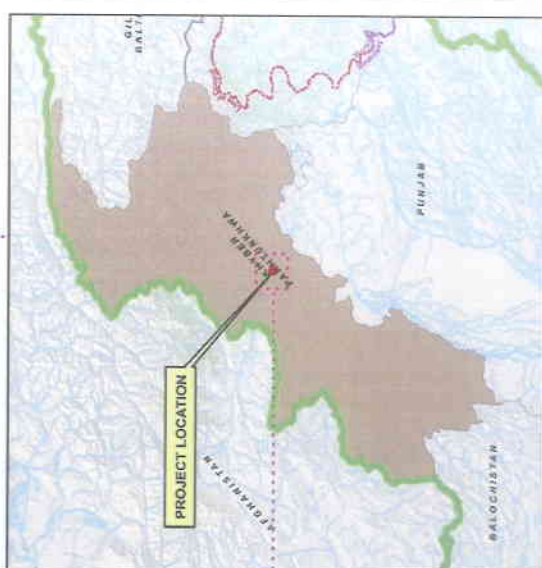
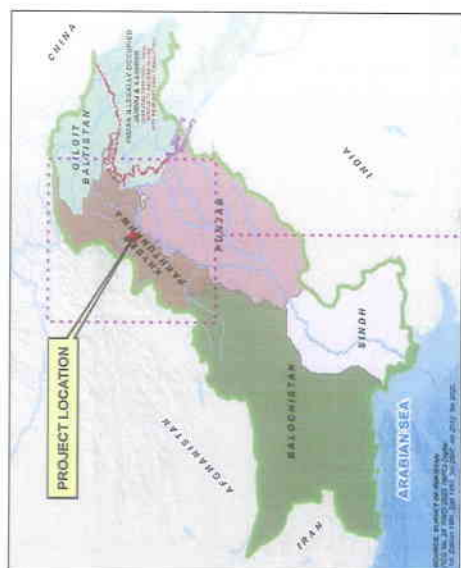
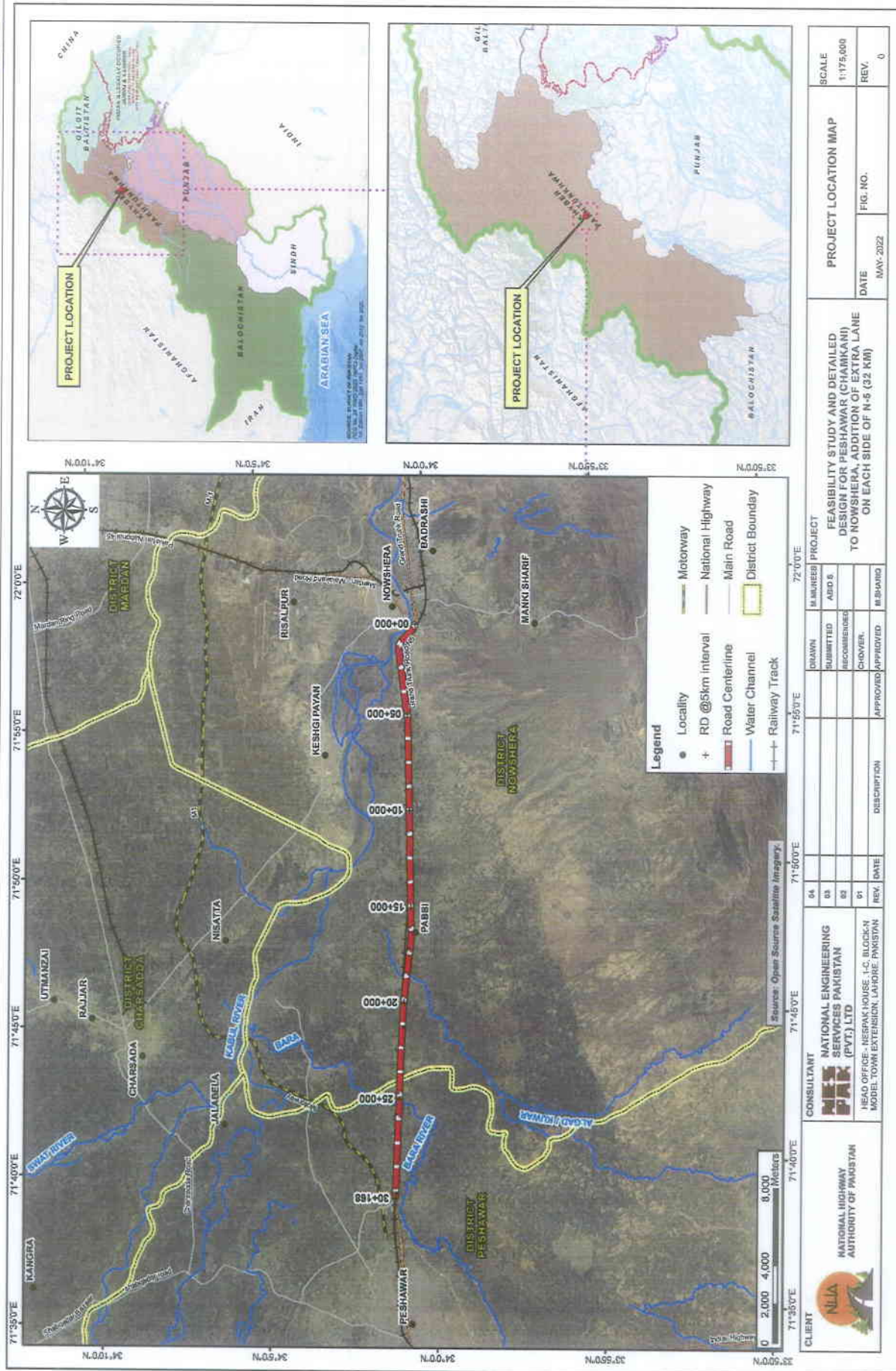
Chamkani – Nowshera section of N-5 has become a point of congestion with slower speed, longer trip times and increased vehicular queuing due to very dense urbanization in this area along N-5 especially at the locations of Pabbi, Tarru Jabba and Amangarh. The traffic of Nowshera-Chitral road (N-45) also uses Nowshera Chamkani Section of N-5. After the launch of CPEC project, Rashakai town of Nowshera is now economic Zone of Khyber Pakhtunkhwa (KP) which has also drawn traffic.

M/s NESPAK (Pvt) Ltd. in JV with M/s New Vision Engineering Consultant and M/s AAN Consulting Engineers has been awarded the contract through open competition of consultancy services for feasibility study and detailed design and Environmental Impact Assessment (EIA) for Peshawar (Chamkani) to Nowshera, Addition of Extra Lanes on Each Side of N-5 (32 Km



The location map of the proposed Project N-5 Chamkani to Peshawar road is shown in **Figure 1.1**.

(The space is intentionally left blank)



CLIENT NATIONAL HIGHWAY AUTHORITY OF PAKISTAN		CONSULTANT NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD HEAD OFFICE - RESPAK HOUSE - I-C BLOCK-N MODEL TOWN EXTENSION, LAHORE, PAKISTAN		PROJECT FEASIBILITY STUDY AND DETAILED DESIGN FOR PESHAWAR (CHAMKANI) TO NOWSHERA, ADDITION OF EXTRA LANE ON EACH SIDE OF N-5 (32 KM)		PROJECT LOCATION MAP SCALE: 1:175,000 DATE: MAY-2022 FIG. NO.: REV.: 0																																																																																																																									
<table border="1"> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> </tr> <tr> <td>01</td> <td></td> <td>REVISED</td> </tr> <tr> <td>02</td> <td></td> <td>APPROVED</td> </tr> <tr> <td>03</td> <td></td> <td>APPROVED</td> </tr> <tr> <td>04</td> <td></td> <td>APPROVED</td> </tr> </table>	NO.	DATE	DESCRIPTION	01		REVISED	02		APPROVED	03		APPROVED	04		APPROVED	<table border="1"> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> </tr> <tr> <td>01</td> <td></td> <td>REVISED</td> </tr> <tr> <td>02</td> <td></td> <td>APPROVED</td> </tr> <tr> <td>03</td> <td></td> <td>APPROVED</td> </tr> <tr> <td>04</td> <td></td> <td>APPROVED</td> </tr> </table>	NO.	DATE	DESCRIPTION	01		REVISED	02		APPROVED	03		APPROVED	04		APPROVED	<table border="1"> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> </tr> <tr> <td>01</td> <td></td> <td>REVISED</td> </tr> <tr> <td>02</td> <td></td> <td>APPROVED</td> </tr> <tr> <td>03</td> <td></td> <td>APPROVED</td> </tr> <tr> <td>04</td> <td></td> <td>APPROVED</td> </tr> </table>	NO.	DATE	DESCRIPTION	01		REVISED	02		APPROVED	03		APPROVED	04		APPROVED	<table border="1"> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> </tr> <tr> <td>01</td> <td></td> <td>REVISED</td> </tr> <tr> <td>02</td> <td></td> <td>APPROVED</td> </tr> <tr> <td>03</td> <td></td> <td>APPROVED</td> </tr> <tr> <td>04</td> <td></td> <td>APPROVED</td> </tr> </table>	NO.	DATE	DESCRIPTION	01		REVISED	02		APPROVED	03		APPROVED	04		APPROVED	<table border="1"> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> </tr> <tr> <td>01</td> <td></td> <td>REVISED</td> </tr> <tr> <td>02</td> <td></td> <td>APPROVED</td> </tr> <tr> <td>03</td> <td></td> <td>APPROVED</td> </tr> <tr> <td>04</td> <td></td> <td>APPROVED</td> </tr> </table>	NO.	DATE	DESCRIPTION	01		REVISED	02		APPROVED	03		APPROVED	04		APPROVED	<table border="1"> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> </tr> <tr> <td>01</td> <td></td> <td>REVISED</td> </tr> <tr> <td>02</td> <td></td> <td>APPROVED</td> </tr> <tr> <td>03</td> <td></td> <td>APPROVED</td> </tr> <tr> <td>04</td> <td></td> <td>APPROVED</td> </tr> </table>	NO.	DATE	DESCRIPTION	01		REVISED	02		APPROVED	03		APPROVED	04		APPROVED	<table border="1"> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> </tr> <tr> <td>01</td> <td></td> <td>REVISED</td> </tr> <tr> <td>02</td> <td></td> <td>APPROVED</td> </tr> <tr> <td>03</td> <td></td> <td>APPROVED</td> </tr> <tr> <td>04</td> <td></td> <td>APPROVED</td> </tr> </table>	NO.	DATE	DESCRIPTION	01		REVISED	02		APPROVED	03		APPROVED	04		APPROVED	<table border="1"> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> </tr> <tr> <td>01</td> <td></td> <td>REVISED</td> </tr> <tr> <td>02</td> <td></td> <td>APPROVED</td> </tr> <tr> <td>03</td> <td></td> <td>APPROVED</td> </tr> <tr> <td>04</td> <td></td> <td>APPROVED</td> </tr> </table>	NO.	DATE	DESCRIPTION	01		REVISED	02		APPROVED	03		APPROVED	04		APPROVED
NO.	DATE	DESCRIPTION																																																																																																																													
01		REVISED																																																																																																																													
02		APPROVED																																																																																																																													
03		APPROVED																																																																																																																													
04		APPROVED																																																																																																																													
NO.	DATE	DESCRIPTION																																																																																																																													
01		REVISED																																																																																																																													
02		APPROVED																																																																																																																													
03		APPROVED																																																																																																																													
04		APPROVED																																																																																																																													
NO.	DATE	DESCRIPTION																																																																																																																													
01		REVISED																																																																																																																													
02		APPROVED																																																																																																																													
03		APPROVED																																																																																																																													
04		APPROVED																																																																																																																													
NO.	DATE	DESCRIPTION																																																																																																																													
01		REVISED																																																																																																																													
02		APPROVED																																																																																																																													
03		APPROVED																																																																																																																													
04		APPROVED																																																																																																																													
NO.	DATE	DESCRIPTION																																																																																																																													
01		REVISED																																																																																																																													
02		APPROVED																																																																																																																													
03		APPROVED																																																																																																																													
04		APPROVED																																																																																																																													
NO.	DATE	DESCRIPTION																																																																																																																													
01		REVISED																																																																																																																													
02		APPROVED																																																																																																																													
03		APPROVED																																																																																																																													
04		APPROVED																																																																																																																													
NO.	DATE	DESCRIPTION																																																																																																																													
01		REVISED																																																																																																																													
02		APPROVED																																																																																																																													
03		APPROVED																																																																																																																													
04		APPROVED																																																																																																																													
NO.	DATE	DESCRIPTION																																																																																																																													
01		REVISED																																																																																																																													
02		APPROVED																																																																																																																													
03		APPROVED																																																																																																																													
04		APPROVED																																																																																																																													

Figure 1.1: Project Location Map

1.3 REQUIREMENT TO CONDUCT EIA

The proposed Project is located in Khyber Pakhtunkhwa province, therefore the Khyber Pakhtunkhwa Environmental Protection Act 2014 is the core environmental laws for the proposed Project.

Under Section 13 of Khyber Pakhtunkhwa Environmental Protection Act 2014, it is mandatory for the proponents of the projects¹ to execute the Initial Environmental Examination (IEE) and/or Environmental Impact Assessment (EIA), where warranted, and get the approval from concerned EPA. Hence for the proposed road project, KP EPA is the concerned authority with respect to environmental approvals.

Khyber Pakhtunkhwa Environmental Assessment Rules, 2021, provides screening categories of projects for which IEE or EIA need to be conducted. The proposed Project falls under the Category 'D' of "Transport" of the Schedule II. This category requires an EIA study to be conducted to initiate the process of environmental approval. Thus, to fulfill the requirements, an EIA Study has been prepared for the proposed Project.

Based on the above requirements of local and national laws an EIA of the proposed Project has been prepared.

1.4 OBJECTIVE OF EIA

The prime objective of the EIA study is to fully meet the statutory requirements set forth by the Khyber Pakhtunkhwa Environmental Protection Act 2014 to facilitate decision making by KPEPA regarding grant of No Objection Certificate (NOC)/Environmental Approval for the proposed Project.

The overall objective of this EIA is to elucidate the anticipated aspects of the proposed intervention and to propose necessary mitigation measures to prevent/minimize adverse impacts on surrounding environment and community.

To achieve this objective, an assessment of the existing environmental conditions of the project corridor is a prerequisite. This EIA has been prepared to ensure adequate environmental and social management during pre-construction, construction and implementation stages of the proposed Project. It provides mechanisms to ensure that potentially significant environmental and social impacts of the proposed Project are identified, assessed and mitigated as appropriate.

More specific objectives of this EIA report are to:

- Facilitate proponents and financiers of the project in ensuring environmental and social sustainability of the project;

¹ No proponent of a project shall commence construction or operation unless he has filed with the Agency an initial environmental examination or environmental impact assessment, and has obtained from the Agency approval in respect thereof.



- Establish a baseline of existing social and environmental conditions prior to project initiation by collecting secondary and primary data/information on physical, biological and socio-economic environment of the project area;
- Identify potentially significant environmental and social impacts (both positive and negative) during all stages of the Project;
- Avoid, minimize, and suggest mitigation and compensation measures for significant adverse impacts;
- Conduct, record and report and ensure public consultation, participation with major stakeholders; and
- Provide EMP for all stages of the project as a tool for the implementation of the suggested measure along with monitoring and evaluation mechanism with adequate resources including implementing agencies capacity building.

1.5 NATURE, SIZE, MAGNITUDE AND LOCATION OF THE PROJECT

The proposed Project starts from Nowshera (intersection point of N-5 with intercity road of Nowshera city at about 800 m from N-45 & N-5 interchange towards Peshawar) and ends at Chamkani (Peshawar) Chamkani Interchange exit ramp on N-5. The proposed Project road is 32 Km long.

The project area falls under two (02) districts i.e. Peshawar and Nowshera. Chamkani lies about 82 mi (or 133 km) west of Islamabad and Rawalpindi in Khyber Pakhtunkhwa. It is a tehsil of Peshawar and falls in the jurisdiction of Maintenance Unit, Peshawar. Nowshera is located in the Valley of Peshawar, lies on the bank of Kabul River, and is approximately 27 miles (43 km) east of the provincial capital Peshawar, along N-5. Swat Expressway also starts near Nowshera and ends near Swat (approx. 35Km), refer **Figure 1.1**.

1.6 PROJECT PROPONENT

NHA is the proponent of proposed Project. The contact details of the project proponent is given below:

NATIONAL HIGHWAY AUTHORITY (NHA)
Address 27 Mauve Area, G-9/1,
Islamabad.
Telephone 092-51-9260565

1.7 CONSULTANT EIA TEAM

The NESPAK's EIA team has been involved in the preparation of this EIA report for the proposed Project. The details of consultant are provided as below:

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LIMITED
(NESPAK)
NESPAK House: 1-C, Block-N, Model Town Extension, Lahore,
54700,
(P.O. Box 1351), Pakistan



Telephone Number: 92-42-99090000
Fax Number: 92-42-99231950
Company E-mail Address: info@nespak.com.pk
Company Website: www.nespak.com.pk

Based on the requirements of Terms of Reference (ToR) and objectives of the study, NESPAK formed a team of experts comprising a team leader (Environmental Specialist) with professional support from the Environmental Engineer, Environmental Scientist, Sociologist and Ecologist. The professional staff was involved in analyzing the data, impact assessment and mitigation measures and report compilation. In addition, the EIA team worked in close coordination with the design team and several inputs were provided by the design specialists to the EIA team. Detail of EIA team is given in **Table 1.1** below:

Table 1.1 : Team Composition for the EIA Study

Sr. No.	Name of Expert	Designation
1.	Muhammad Sharif Ahmed	Chief Engineer/Head ERSD
2.	Mr. Imran Shafique Butt	Project Manager
3.	Ms. Uzma	QA member
4.	Mr. Hafiz Muhammad Abid Saleem	Sr. Environmental Engineer
5.	Ms. Ramla	Sr. Environmental Scientist
6.	Mr. Ibadullah Khan	Sr. Ecologist
7.	Mr. Kamran Ahmed	Sr. Sociologist
8.	Mr. Muhammad Abdul Basit	Jr. Environmental Engineer
9.	Mr. Muneeb Yousuf	GIS Expert

1.8 APPROACH AND METHODOLOGY

The detailed approach and methodology used for the EIA study is provided below.

1.8.1 Literature Review

The Consultants conducted a desktop study through collection and review of guidelines, data and reports related to the Project, that included (a) review of National Environmental Legislations; (b) Google Earth Satellite Imagery; (c) Relevant District Census Reports (DCR) and any other relevant documents/drawings; and (d) Reference similar projects EIA documents.

1.8.2 Review of Environmental Laws and Institutional Requirements

All the applicable environmental policies, laws, guidelines, acts and legislations of the Government of Pakistan (GoP) and Khyber Pakhtunkhwa will be reviewed. .

1.8.3 Delineation of Corridor of Impact (Col)

As per the national regulations, impacts and risks have been analyzed within the project Col. The Col of the project encompasses primary project site(s) and related facilities that the Client and Contractor develops or controls, such as proposed road and access roads, borrow pits, disposal areas and construction camps. Environmental impacts and risks will also be analyzed



for all relevant stages of the project cycle, including pre-construction, construction and operation phases of the project.

The Col includes the actual Right of Way (RoW) of Project as well as the surrounding areas where positive and adverse impacts may be foreseen due to the implementation of the Proposed Project. RoW of the proposed Project is around 220 feet. Col is taken as 32 feet beyond RoW on both sides. **Figure 1.2** represents the Index RoW and Col of the proposed road. Land use maps in the Col and RoW are shown in **Annex II**.

(The space is intentionally left blank)



Figure 1.2 : Index Row and Col of the Proposed Project



1.8.4 Survey of Col

A team of environmental and social experts, including environmental engineer, ecologist and sociologist carried out the environmental and social survey of the Col to familiarize themselves with the local conditions and the environmental settings. During the survey, the information regarding the topography, soils, surface water, groundwater, flora and fauna, forested areas, social settings and villages/towns along the Col was observed.

1.8.5 Analysis of Alternatives

It is a mandatory requirement for EIA study to analyze each potential alternative available that could have been developed to meet the objectives and recommend the most environmentally and economically feasible option.

The analysis of different alternatives was carried out for the selection of the most feasible options of the study keeping in view the environmental, economic and social constraints. Moreover, the No Project Option (NPO) was also considered with reference to the increased traffic volume and time delay due to existing infrastructure. This exercise confirmed the justification for the need of the proposed Project.

1.8.6 Environmental Baseline Survey of the Project

After the selection of the most feasible route for the proposed Project based on satellite images and the delineation of Col, detailed environmental survey was carried out within the Col. Detailed investigations/surveys were carried out for environmental parameters on which any adverse or positive impacts were envisaged by the implementation of the proposed Project. The data presented in the forthcoming sections has been collected from the primary and secondary sources. For primary data acquisition, the Environment and Social team conducted the field visit during the month of May, 2022. Prior to the start of field activities, comprehensive checklists, proformas and maps were developed covering the following main parameters:

a) Physical Environment

The information acquired for the establishment of physical environment baseline included the following main parameters:

1. Land resources (including landuse pattern, soil composition, contamination of soil and soil erosion etc.);
2. Water resources (including available surface and groundwater resources and natural streams, hydrology, water supply, water contamination etc.);
3. Climate data (including temperature, rainfall, humidity, wind speed and direction etc.);
4. Ambient air quality and noise level monitoring data;
5. Existing solid waste management and effluents disposal practices and storm water drainage;
6. Buildings and infrastructure details, including residential, commercial and animal shed for complete/partial relocation;
7. Religious, cultural and heritage information (mosques, shrines, graveyards);
8. Archaeological monuments; and



9. Other private/public infrastructures such as roads, telephone poles, transmission lines, irrigation channels, hand pumps, tube wells etc.

b) Ecological Environment

- Flora (trees, herbs, shrubs, grasses and overall vegetation including valuable or rare trees and their loss due to implementation of the Project etc.);
- Fauna/ Wildlife (Mammals, reptiles, amphibians and avifauna.);
- Agriculture and livestock;
- Reserved forests, Guzara forests, Community forests/ Private forests and wildlife sensitive or notified areas in Col/RoW, if any;
- Migratory birds' corridors (if any); and
- Endangered species (both flora and fauna, if any).

c) Socio-Economic Environment

Socio-Economic Environment deals with the information on socio-economic and cultural environment of the study area that falls in District Peshawar and District Nowshera. Socio-economic information has been gathered through secondary data and telephonic consultations with stakeholders and consulting various documents such as DCRs and other secondary data available from the concerned districts from the web.

It deals with the existing social conditions of the proposed Project area. During the desk/ office study, available reports / documents were comprehensively reviewed. To achieve the project objectives, it is imperative to study the prevailing socio-economic and socio cultural aspects of their livelihoods. Therefore socio economic surveys were conducted to understand the social baseline of the Project area.

1.8.7 Stakeholder Consultations

The Consultants identified project stakeholders and held meetings with them during the surveys to receive feedback on the expected environmental issues related to the project impacts and suggested mitigation measures. Meetings were carried out with the project affectees, relevant departments including Forest, Wildlife, Environment, , Irrigation etc. to discuss the issues/constraints and get their views and feedback to mitigate the potential environmental impacts associated with the implementation and operation of the project. Consultations/group discussions were carried out with the locals residing along the Col.

The proceedings of the consultations/meetings along with the photographs and list of participants are documented in Chapter 6.

1.8.8 Impact Assessment and Mitigation Measures

A logical and systematic approach was adopted for impact identification and assessment. The process began during the screening and continued through scoping which identified the key issues and classified them into different categories. The tools, which were used for impact assessment, are:



- Checklists (Physical & Ecological);
- Proformas (Social Assessment);
- Matrices; and
- Overlays.

Identification of potential environmental and social impacts in terms of their nature, magnitude, extent, location, timing and duration were carried out. The impacts were correlated to the Project location, design stage, construction as well as operation stage. Based on the impacts prediction methods and as a result of public/stakeholder consultations, NESPAC screened the adverse environmental impacts for inclusion in the mitigation measures and EMP. The same process was followed for the identification of social impacts. Public consultations (which provided feedback of the impacts from the stakeholder's viewpoint) were used to screen out the insignificant impacts. Matrices and overlays were used for the evaluation of temporal and spatial impacts respectively.

1.8.9 Environmental Management Plan (EMP)

An EMP has been prepared to ensure the adequacy and effectiveness of the proposed protocol by clearly identifying the roles and responsibilities of the agencies responsible for implementation, monitoring and auditing of EMP activities, existing and suggested framework, necessary approvals, training needs and the required further studies. The EMP also includes organizational setup, a monitoring mechanism, monitoring plan, environmental and social parameters to be monitored with their frequency. Similarly, costs for environmental monitoring, ecological and social component/social mitigation measures were also included as part of the EMP. Environmental monitoring, evaluation, auditing and reporting mechanism were also proposed in the EMP.

1.8.10 Conclusions and Recommendations

Based on the baseline conditions, identified impacts and suggested mitigation measures and proposed environmental cost, conclusions have been developed along with recommendations regarding the future plan of action and outcome of the EIA report.

1.9 ORGANIZATION OF REPORT

This report contains ten chapters. The contents of chapters are described as under:

- **Chapter 1** – "Introduction" describes introduction, location of project, objective and purpose of the EIA report;
- **Chapter 2** – "Environment Legislative Requirements and Framework" elucidates the current legal framework including national and international's guidelines which is applicable to the proposed Project in the context of environment and sustainable development;
- **Chapter 3** – "Project Description" furnishes an overall description of the project, including its background, features and key components, timeframe, cost and Project Alternatives;



- **Chapter 4** – “Description of the Environment” comprises a detailed narrative of the existing (baseline) conditions of the project area, with respect to its physical, biological and socio-economic environment;
- **Chapter 5** – “Stakeholder Consultations, Consultation and Participation” provides summary of consultative sessions with the local community as well as with other stakeholders including local politicians, local government officials, policy makers and Non-Governmental Organizations (NGOs) for their opinions and suggestions on the project;
- **Chapter 6** – “Anticipated Environmental Impacts & Mitigation Measures” elaborates the likely impacts of the project on the physical, biological and socio-economic environment during the construction and operation stages and lays down the proposed measures to mitigate the adverse impacts of the project;
- **Chapter 7** – “Environmental Management Plan” provides the mechanism to be adopted for the implementation of measures and monitoring the environment during all stages; and
- **Chapter 8** – “Conclusion and Recommendations” gives the conclusion of the impact assessment study and recommendations for the construction and operational stages.

(The space is intentionally left blank)



2 POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORKS

2.1 GENERAL

This chapter provides an overview of the policy framework and legislation that applies to control the environmental consequences as a result of project implementation and operation. The project needs to comply with all the applicable environmental policies, laws, guidelines, acts and legislations of Government of Pakistan and the provincial government.

The summary of major relevant strategies, policies, acts and legislation from environmental perspective are briefly described in Tables 2.1 & 2.2 below:

Table 2.1: Main Strategies/Policies Related to Environment and Relevance to the Project

Sr. No.	Policy/Strategy	Brief Coverage	Relevance to Project
1.	National Conservation Strategy, 1992	Pakistan National Conservation Strategy (PNCS), which was approved by the federal cabinet in March 1992, is the principal policy document on environmental issues in the Country. The NCS outlines the Country's primary approach towards encouraging sustainable development, conserving natural resources and improving efficiency in the use and management of resources. The NCS has 68 specific programs in 14 core areas in which policy intervention is considered crucial for the preservation of Pakistan's natural and physical environment.	The core areas that are relevant in the context of the proposed Project are pollution prevention during construction and conserving biodiversity and forestry.
2.	National Environmental Policy, 2005	In March 2005, Government of Pakistan (GoP) launched its National Environmental Policy, which provides a framework for addressing the environmental issues. Section 5 of the policy commits for integration of environment into development planning as instrument for achieving the objectives of National Environmental Policy. It also provides broad guidelines to the Federal Government, Provincial Governments, Federally Administered Territories and Local Governments to address their environmental concerns and to ensure effective management of their environmental resources.	Clause (b) of sub-section 5.1 states that Environmental Protection Act, 1997, will be diligently enforced for all developmental projects.
3.	National Forest Policy, 2001	The goal of this policy is to foster the sustainable development of Renewable Natural Resources (RNR) in Pakistan, through maintenance and rehabilitation of these essential resources and enhancement of sustainable livelihoods	The proposed Project does not pass through a Reserve Forest or other notified areas. However, other relevant components like wildlife conservation, planting trees will



Sr. No.	Policy/Strategy	Brief Coverage	Relevance to Project
		<p>of rural masses, particularly women, children and other deserving groups. The various components of the policy include:</p> <ul style="list-style-type: none">• Reducing poverty, powerlessness and unemployment;• Population planning in critical ecosystems;• Reducing the impact of socio-economic factors;• Providing substitutes to firewood in the mountain-woods;• Reducing political interferences in Forestry and Wildlife Departments;• Renovating and invigorating the institutions of RNR;• Supporting Local Governments in the sustainable development of their RNR;• Policies for fragile ecosystems;• Riverside forests;• Irrigated plantations;• Preservation of sensitive and unique forests;• Wildlife conservation;• Rangelands and desert ecosystems; and• Planting trees and fodder on farmlands.	<p>be applicable. The Proposed Project involves the tree cutting along the route so the relevant clauses of preservation of the policy will be applicable.</p>
4.	National Disaster Risk Reduction Policy, 2013	<p>Disasters have an enormous and significant adverse impact on the development of key sectors of economy like agriculture, infrastructure, housing, health, and education and above all the environment, they result in a serious social and economic set-back to the sustainable development. Disasters also pose threat to increasing poverty and resultantly back slide the national development targets set to achieve the Millennium Development Goals (MDGs). Climate change induced disasters pose even greater threat to sustainable development in developing country like Pakistan which is ranked quite amongst the most vulnerable countries. Continuous floods of 2010, 2011 and 2012 are seen as an indication of more intense and frequent extreme events in the future.</p> <p>Disaster risk reduction interventions were being carried out in the country till date by different departments / agencies in isolation at national, province and district levels. There was a strong need to give</p>	<p>This policy will be elicited if any unforeseen natural and man-made disaster occurs during construction and operation phase of the proposed Project.</p>



Sr. No.	Policy/Strategy	Brief Coverage	Relevance to Project
		them directions and sound guidelines to align their activities in line with the true spirit of National Disaster Management Act (NDMA), 2010 to counter the threats of disasters faced by the country. NDMA, being the lead focal agency for disaster preparedness and management, has therefore, embarked upon formulation of a comprehensive National Disaster Risk Reduction Policy through wider consultations with all stakeholders including all provinces, state of A.J&K and regions. This policy covers disasters risk reduction in a more holistic way and introduces a proactive and anticipatory approach by laying special emphasis on risk assessment and prevention.	
5.	Biodiversity Action Plan, 1999	The basic aim of the plan is to ensure conservation and sustainable use of biodiversity.	The plan recognizes EIA/IEE as an effective tool for identifying and assessing the effects of a proposed operation on biodiversity.
6.	Pakistan Labour Policy, 2010	The main objective of the Labour Policy, 2010 is the social and economic well-being of the labour of Pakistan. The Labour Policy, 2010 has following 4 parts: <ul style="list-style-type: none">• Legal Framework;• Advocacy: rights of workers and employers;• Skill development and employment; and• Manpower export.	The labour will be employed for construction of the proposed Project. The provision of policy will apply to all the labour employed.
7.	National Power Policy, 2013	The Government of Pakistan announced a National Power Policy in 2013 setting nine goals for improving the power situation in the country. "Creating a culture of energy conservation and responsibility" was included as one of the nine goals. In line with this goal, a federal energy conservation bill, the National Energy Efficiency and Conservation Bill (NEE&C) 2016 was passed. This bill empowers the provincial bodies to implement and monitor the NEE&C program activities.	This policy will be applicable as proposed will use energy conservative technologies to sustainably use resources.
8.	National Climate Change Policy, 2012	The National Climate Change Policy provides a framework for addressing the issues that Pakistan faces or will face in future due to the changing climate. In view of Pakistan's high vulnerability to the adverse impacts of climate change, in particular extreme events, adaptation effort is the focus of this policy document. The vulnerabilities of various sectors to climate change have been highlighted	This policy document is a 'living' document and will be reviewed and updated regularly to address emerging concepts and issues in the ever-evolving science of climate change. This policy will accelerate due to the emissions from the construction machinery.



Sr. No.	Policy/Strategy	Brief Coverage	Relevance to Project
		<p>and appropriate adaptation measures spelled out.</p> <p>The policy cover measures to address issues in various sectors such as water, agriculture, forestry, coastal areas, biodiversity and other vulnerable ecosystems.</p> <p>Notwithstanding the fact that Pakistan's contribution to global Greenhouse Gas (GHG) emissions is very small, its role as a responsible member of the global community in combating climate change has been highlighted by giving due importance to mitigation efforts in sectors such as energy, forestry, agriculture and livestock.</p> <p>Furthermore, appropriate measures relating to disaster preparedness, capacity building, institutional strengthening; technology transfer; introduction of the climate change issue in higher education curricula; ensuring environmental compliance through IEE and Environmental Impact Assessments (EIA) in the development process; addressing the issue of deforestation and illegal trade in timber; promoting Clean Development Mechanisms (CDM); and raising Pakistan's stance regarding climate change at various international forums, have also been incorporated as important components of the policy.</p> <p>The policy thus provides a comprehensive framework for the development of Action Plans for national efforts on adaptation and mitigation.</p>	
9.	National Water Policy 2018	This first ever water policy was unanimously approved in April 2018 by Council of Common Interest (CCI). The Policy aims at efficient management and conservation of existing water resources, optimal development of potential water resources, steps to minimize time and cost overruns in completion of water sector projects, equitable water distribution in various areas and canal commands, measures to reverse rapidly declining groundwater levels in low-recharge areas, increased groundwater exploitation in high-recharge areas, effective drainage interventions to maximize crop production, improved	This policy will be applicable to the proposed Project in the context of the drinking water demand, sewage disposal and handling of wastewater.



Sr. No.	Policy/Strategy	Brief Coverage	Relevance to Project
		<p>flood control and protective measures, steps to ensure acceptable and safe quality of water, minimization of salt build-up and other environmental hazards in irrigated areas, institutional reforms to make the managing organizations more dynamic and responsive.</p> <p>The policy covered all water related issues, including water uses, allocation of priorities, integrated planning for development, use of water resources, environmental integrity of the basin, impact of climate change, trans boundary water sharing, irrigated and rain fed agriculture, drinking water and sanitation, hydropower and industry, groundwater, water rights & sustainable water infrastructure, water related hazards, quality management, awareness, conservation, legal and capacity building of infrastructure.</p>	
10.	National Drinking Water Policy, 2009	The National Drinking Water Policy provides a framework for addressing the key issues and challenges facing Pakistan in the provision of safe drinking water to the people. Drinking water is the constitutional responsibility of the provincial governments and the specific provision function has been devolved to specially created agencies in cities and Town and Tehsil Municipal Administrations under the Local Government Ordinance 2001.	This policy is applicable for the proposed Project during construction phase in terms of regular water quality monitoring.
11.	National Resettlement Policy, 2002	In March, 2002 Pakistan Environmental Protection Agency (Pak-EPA), GOP has issued its National Resettlement Policy, which explains the basis for compensation, rehabilitation and relocation of the affectees. It also explains the requirements and implementation of Resettlement Action Plan (RAP).	This policy is not applicable as proposed Project site/ RoW is owned by the NHA.
12.	National Sustainable Development Strategy, 2012	The National Sustainable Development Strategy is an attempt to define sustainable development and the pathway to a "green economy" in Pakistan's context. It lays out an adaptive system and approach that can be continuously improved, through regular updates, to respond to evolving challenges. The focus has been on integrating not only across the three overall dimensions of economic, social and environment but also integrating the goals with the existing development	This strategy is applicable as the project involves the construction of roads and bridges to improve the traffic situation with least environmental burden and sustainable operation of transportation in the city.



Sr. No.	Policy/Strategy	Brief Coverage	Relevance to Project
		paradigm with the aim of shifting it on to a more sustainable pathway.	
13.	National Action Plan for COVID-19 Pakistan	<p>Government of Pakistan has launched the National Action Plan for COVID-19 Pakistan to combat the challenge of prevailing virus, also available at https://www.nih.org.pk/wp-content/uploads/2020/03/COVID-19-NAP-V2-13-March-2020.pdf. The Government of Pakistan has launched the real-time data portal for COVID-19 http://covid.gov.pk/. These measures are mostly relating to the containment and awareness and capacity building. Besides this COVID-19 daily situation report is also available at https://www.nih.org.pk/wp-content/uploads/2020/04/COVID-19-Daily-Updated-SitRep-03-April-2020.pdf.</p>	This Action Plan for COVID-19 is applicable to the proposed Project as it is being launched during this pandemic.
14.	KP Climate Change Policy 2016	<p>Pakistan has drafted its National Climate Change Policy in 2012. However, after the 18th amendment in the constitution of Pakistan, the Govt. of KP decided to formulate a Provincial Climate Change Policy to be more specific, target oriented and also in line with National Climate Change Policy of Pakistan 2012 - thus a Provincial Climate Change Policy was formulated for the first time in June, 2016, to the specific needs of the Province.</p> <p>The Policy highlights sectors that need mitigation measures such as energy, transport, wastes, industries, urban planning etc. It also gives emphasis, to streamline Climate Change in different sectors of the economy and developmental projects in the Province to make a sustainable development and create resilience to natural disasters. Successful implementation of the Policy in relevant sectors like agriculture, water resources, forestry, wildlife etc. will help in achieving targets pertaining to Climate Change resilience. This law will enforce the implementation of mitigation measures such as energy, transport, wastes, industries, urban planning etc.</p>	This policy is applicable as the proposed Project might affect the regional climate of the area.
15.	Culture Policy, Khyber Pakhtunkhwa, 2018	The KP culture policy goals are to create an enabling environment in which Cultural Heritage Sector can flourish and play a significant and defining role in nation building, safeguarding of identity and socioeconomic development. The	This policy is applicable to the proposed Project as the improvement of road from Nowshera to Chamkani will result in the development of



Sr. No.	Policy/Strategy	Brief Coverage	Relevance to Project
		primary objective of KP cultural policy is to achieve the economic and social development and moderate the problems faced by existing cultural sector. KP culture policy aims to provide an environment conducive to the protection, growth and promotion of indigenous culture heritage. This policy will protect the cultural integrity of the province throughout the project area	cultural sector of these and or nearby areas.

Table 2.2: Main Legislation/Acts Related to Environment and Their Relevance to the Project

Sr. No.	Act	Brief Coverage	Relevance to Project
1.	Khyber Pakhtunkhwa Environmental Protection Act 2014	Post the adoption of the 18th Constitutional Amendment in 2011, the subject of environment was devolved, and the provinces have been empowered for environmental protection and conservation. Subsequently, the KP Government amended PEPA 1997 as KP Environmental Protection Act 2014, and KP EPA is responsible for ensuring the implementation of provisions of the Act in KP's territorial jurisdiction. KP EPA is also required to ensure compliance with the NEQS and establish monitoring and evaluation systems. In case any project falls under Schedule I or II of this Act, the relevant IEE (or EIA where required) will be developed and submitted to EPA KP for issuing NOC before commencing any physical work. This law will enforce the implementation of environmental legislations at provincial level and will be responsible for issuing No Objection Certificates (NOCs).	<p>The provision of the act is applicable to proposed Project for conducting an IEE/EIA according to section 13 and to obtain environmental approval from the EPA.</p> <p>The section 11 of this act prohibits certain discharges or emissions into the environment.</p> <p>Section 13 of this act also enables the agency to carry out strategic environmental assessment if the plan involves transport and infrastructure, whereas section 14 prohibits the import of hazardous substances.</p> <p>Similarly, the provisions of section 17 are also applicable to comply with the discharge or emission of any effluent, waste, air pollutant or noise or disposal of waste or handling of hazardous substance. Under section 18, penalties will apply if anyone fails to comply with the provisions of section 11, 12, 13, 14 and 17.</p>
2.	Khyber Pakhtunkhwa Environmental Assessment Rules, 2021	These regulations set out: <ul style="list-style-type: none">• Key policy and procedural requirements for filing an EIA / IEE;• The purpose of environmental assessment;• The responsibilities of proponents;• Duties of responsible authorities;	The proposed Project falls under the Category 'D' of "Transport" of the Schedule II. This category requires an EIA study to be conducted to initiate the process of environmental approval.



Sr. No.	Act	Brief Coverage	Relevance to Project
		<ul style="list-style-type: none">• Provides schedules of proposals that the project requires IEE, EIA or General Environmental Approval (GEA);• The environmental screening process of the projects under schedule I, II, III and IV; and• The procedure for the environmental approval for filing the case with the concerned EPA for the granting of the NOC.	
3.	KP Wildlife and Biodiversity Act, 2015	<p>KP Wildlife Act is expedient to provide for the protection, preservation, conservation and management of wildlife in KP. The aims and objects of this Act are the:</p> <ul style="list-style-type: none">• Strengthening the administration of the organization to effectively manage wild animals and their habitats;• To holistically manage Protected Areas in sustainable manners for the best interest of the indigenous communities and local stakeholders;• Securing appropriately the goods and services produced from wild animals and their habitats at the level of local communities;• Fulfilling the obligations envisaged under the biodiversity related multilateral environmental agreements ratified by the Government of Pakistan;• Promotion of public awareness and capacity building for proper appreciation of the environmental significance and socio-economic values of wildlife; and• Conservation of biological diversity and realization of its intrinsic and extrinsic values through sustainable use and community participation.	The proposed Project involves the cutting of trees which may result in loss of habitat, therefore, the provisions of this law are applicable.
4.	KP Forest Ordinance 2022	This Ordinance prohibits construction of any building or shed, road or enclosure, or any infrastructure, or altering or enlarging any existing road or infrastructure in a reserved forest. It also	This act might be triggered as the proposed Project involves the cutting of trees.



Sr. No.	Act	Brief Coverage	Relevance to Project
		ban any cutting, felling or uprooting any tree or brushwood listed in Schedule -I. Furthermore, it also disallows to quarry stone from reserved forests. Due to the close proximity with a number of reserved forests, the mentioned provisions of this law will need to be taken into account.	
5.	Khyber Pakhtunkhwa Antiquities Act, 2016	This act pertains to protect, preserve, develop and maintain antiquities in the Province the KP. It extends to the whole of the Province of the KP. This act contains VII Chapters. Clause 55& 56 of Chapter IV, Development Schemes, New Construction and use of Movable Antiquities is applicable and require NOC from Directorate in case of vicinity of any protected immovable antiquity.	The provisions of this act would also be applicable, if any accidental archaeological discoveries may occur during the excavation works for the construction of proposed Project.
6.	KP Commission on Status of Women	The KP Commission on the Status of Women is a statutory advisory body established under the Khyber Pakhtunkhwa Act XIX of 2009 which was amended by the Khyber Pakhtunkhwa Assembly under the new Act XXVIII of 2016. The Commission in KP is the first ever Provincial Level Commission in the country, established with functions to oversee implementation of laws, policies and programs related to women and propose new measures where gaps exist. The third term of the Provincial Commission on the Status of Women was notified in January 2017.	It is applicable as the proposed Project may involve female labor force.
7.	Guidelines for the Preparation and Review of Environmental Reports, 1997	<p>These guidelines describe the format and content of IEE/EIA reports to be submitted to KPEPA for obtaining NOC/approval.</p> <p>The guidelines present:</p> <ul style="list-style-type: none">• The environmental assessment report format;• Assessing impacts;• Mitigation and impact management and preparing an EMP;<ul style="list-style-type: none">◦ Reporting;• Review and decision making;• Monitoring and auditing; and<ul style="list-style-type: none">◦ Project Management.	The guidelines are applicable for the preparation of the EIA.
8.	Guidelines for Environmental Assessment	Pak-EPA has published a set of environmental guidelines for conducting environmental assessments and the environmental management of different types of development Projects. The	The guidelines are applicable for the preparation of the EIA.



Sr. No.	Act	Brief Coverage	Relevance to Project
		<p>guidelines that are relevant to the proposed Project are listed below.</p> <ul style="list-style-type: none">Guidelines for the Preparation and Review of Environmental Reports, Pak-EPA, 1997;Guidelines for Public Consultation, Pak-EPA, May, 1997; andSectoral Guidelines: Pakistan Environmental Assessment Procedures, Pak-EPA, October 1997.	
9.	Pakistan Penal Code, 1860	The Code deals with the offences where public or private property or human lives are affected due to intentional or accidental misconduct of an individual or organization. The Code also addresses control of noise, noxious emissions and disposal of effluents.	The provisions of the Penal Code, 1860 are applicable to the project in terms of penalties for effecting human lives and public property. It also addresses the control of noise, air emissions and effluent disposal.
10.	The Protection against Harassment of Women at the Workplace Act, 2010	The Protection Against Harassment of Women at the Workplace Act (2010) refers to sexual harassment at the workplace.	This Act will be applicable to the proposed Project if women are employed for the construction activities..
11.	Labour Laws as part of Constitution of Pakistan 1973,	<p>The Constitution of Pakistan contains a range of provisions with regards to labour rights, in particular:</p> <ul style="list-style-type: none">Article 11 of the Constitution prohibits all forms of slavery, forced labour and child labour;Article 17 provides a fundamental right to exercise the freedom of association and the right to form unions;Article 25 lays down the right to equality before the law and prohibition of discrimination on the grounds of sex alone; andArticle 37(e) makes provision for securing just and human conditions of work, ensuring that children and women are not employed in vocations unsuited to their age or sex, and for maternity benefits for women in employment. <p>Labour law is controlled at both provincial and national levels with compulsory employment agreements containing the terms set out by the labour laws. The labour laws are a comprehensive set of laws in Pakistan dealing with the following aspects:</p>	<p>The labour laws will be relevant as it would deal with employment of labour for the construction of propose project. Following are the major labour laws which are applicable to the project:</p> <ul style="list-style-type: none">Bonded Labour System (Abolition) Act, 1992Employment of Child Act, 1991Minimum Wages Ordinance, 1961Industrial Relations Act, 2010West Pakistan Minimum Wages for Unskilled Workers' Ordinance, 1969



Sr. No.	Act	Brief Coverage	Relevance to Project
		<ul style="list-style-type: none">◦ Contract of Employment;• Termination of Contract;• Working Time and Rest Time;• Working hours;• Paid Leave;• Maternity Leave and Maternity Protection;• Other Leave Entitlements;• Minimum Age and Protection of Young Workers;• Equality• Pay Issues;• Workers' Representation in the Enterprise;• Trade Union and Employers Association Regulation; and◦ Other Laws.	
12.	Employment of Children Act, 1991	Article 11(3) of the Constitution of Pakistan prohibits employment of children below the age of 14 years in any construction, or any other hazardous employment. In accordance with this Article, the Employment of Child Act 1991 prohibits child labour (a child is under 14 years old).	The relevance of this act to the project will be to prohibit child employment for construction of the proposed Project.
13.	The Khyber Pakhtunkhwa Prohibition of Employment of Child Act, 2015	Clause 3 states that No child shall be employed or permitted to work in any establishment provided that a child not below the age of 12 years may be engaged in the light work, alongside his family member, for a maximum of two hours per day mainly for the purpose of acquiring skills, in a private undertaking, or in any school established, assisted or recognized by Government for such purpose.	The relevance of this act to the project will be to prohibit child employment for construction of the proposed Project.
14.	Pakistan Climate Change Act, 2017	This Act aims to meet obligations under international conventions relating to climate change and to provide for adoption of comprehensive adaptation and mitigation policies, plans, programmes, projects and other measures required to address the effects of climate change and for matters connected herewith and ancillary thereto.	This Act will be triggered due to the emissions from the construction machinery.
15.	Seismic Building Code of Pakistan (BCP) 2007	This code stipulates the minimum requirements for seismic safety of building and structures and the provisions of the BCP (Seismic Provisions-2007) shall apply for engineering design of buildings, like structures and related components.	This Code is applicable to the proposed Project as it includes the formation of structures.



Sr. No.	Act	Brief Coverage	Relevance to Project
		Construction of buildings shall be considered as violation of professional engineering work specified under clause (XXV) of section 2 of the Act.	
16.	Land Acquisition Act (LAA), 1894 Including Later Amendments	The Land Acquisition Act, 1894, is a "law for the acquisition of land needed for public purposes and for companies and for determining the amount of compensation to be paid on account of such acquisition". The exercise of the power of acquisition has been limited to public purposes. The principles laid down for the determination of compensation, as clarified by judicial pronouncements made from time to time, reflect the anxiety of the law-giver to compensate those who have been deprived of property, adequately. The land needed for the construction of development projects will be acquired under normal conditions based on prevailing market prices or negotiated prices between client and the owners of land. Section 17(4) of the LAA will not be used in the absence of an emergency. Instead, the land will be purchased under willing-seller willing-buyer deal at agreed upon market rates and the seller will have the option not to sell the land, in case an acceptable deal for both the parties is not reached.	This Act will not be applicable as proposed Project will not involve permanent acquisition land in the Project area.
17.	Fisheries Act, 1897	This Act aims at the protection of fish in water bodies by rules of State Government.	This Act will not be applicable as the proposed Project activities will not affect the fisheries. .
18.	Cutting of Trees (Prohibition) Act, 1975	The Act was enforced in 1975 to place restrictions on cutting of trees in order to restrain unchecked trend of tree felling without replacement plantations.	This act will be applicable to the subject Project where the cutting of tree will be involved.
19.	The Khyber Pakhtunkhwa Protection of Trees and Brushwood Act, 1949	This act was enforced in 1949 to protect the trees and brushwood belonging to the Government and Local bodies.	This act will be applicable to the subject Project where the cutting of tree will be involved.
20.	The Canal and Drainage Act (CDA) 1873	CDA 1873 focuses on construction and maintenance of drainage channels and defines powers to prohibit obstruction or order their removal. It also covers issues related to canal navigation. It briefly addresses issues relating to environmental pollution. Section 70(5) of the CDA clearly states that no one is allowed to "corrupt or foul the water of any canal so as to render it less fit for the	This act will be applicable as the proposed alignment traverses through nullahs.



Sr. No.	Act	Brief Coverage	Relevance to Project
		purposes for which it is ordinarily used." In addition, Section 73 of the CDA gives power to arrest without warrant or to be taken before the magistrate a person who has wilfully damaged or obstructed the canal or "rendered it less useful."	
21.	National Disaster Management Act, 2010	National Disaster Management Act, 2010 was passed by Parliament of Pakistan in 2010. The Act applies to whole Pakistan. The Act was passed in backdrop of 2010 Floods in Pakistan and strengthens Disaster Management system.	This act is applicable to the proposed Project. The proposed Project will require special consideration to disasters and risk management strategies as per the Act.
22.	Hazardous Substance Rule, 2003	The rule describes the procedure of handling, transportation and disposal of hazardous substances and hazardous waste. Inter alia, general safety precautions for handling hazardous substances as well as safety precautions for workers, and notification requirements in the event of an accident are described in these rules. Requirements for project waste management plans are also defined. These include a requirement for updating the plan every three years, the need to provide for management of hazardous waste in a manner that will prevent adverse environmental impacts and to ensure that hazardous and non-hazardous waste are not mixed.	This rule is applicable to the proposed Project due to involvement of hazardous waste handling, use and disposal during the construction stage.
23.	Building Code of Pakistan, 2007	The provision of BCP shall apply for engineering design of building like structure and related components. The construction in violation of the Building code shall be deemed as violation of professional engineering work. Moreover, a certificate for the proposed action will be obtained from Provincial Building Control Authority.	These codes shall be used in structural design of building area components constructed under this proposed Project.

2.2 CHECKLIST OF PROCEDURE FOR ENVIRONMENTAL ASSESSMENT

Prior to any Environmental approval being granted by the responsible authority, the following steps should be undertaken:

- First of all, the proponent should identify whether the site for the proposed development is within the precincts of a protected ecosystem, cultural and archaeological sites. For this, NHA should refer to the list of notified ecosystem, archaeological and historical sites. This list was last updated in April 1997. If the proposed site is not located in a notified area and there are no apparent ecological or cultural values associated with the site, take no further action;



- If NHA or NESPAK identifies an ecological site that appears to be of importance, but the site is not listed, they should discuss the site with the relevant conservation authority;
- If the site falls within the boundaries of a protected ecosystem, the relevant conservation authority in each province should be contacted for advice about the extent to which the development may be allowed and with what conditions. Certain protected areas may have total prohibition of development while others may allow controlled development;
- The relevant conservation authority should inform the responsible authority of their assessment of the significance of the likely impacts of the proposed development early in the process in order for the responsible authority to determine the level of documentation required. The Provincial EPA (KP EPA) will then be in a position to review the level of reporting required in the light of the advice from the conservation authorities; and
- During the review of the environmental report, the responsible authority will liaise with the Conservation Authority to ensure that the impacts and mitigation measures detailed in the environmental report are well based to frame environmental approval conditions, which protect the values of the listed area.

2.3 COMPLIANCE PROCEDURE FOR OBTAINING NOC FROM KPEPA

Khyber Pakhtunkhwa Environmental Assessment Rules, 2021 provide the necessary details on the preparation, submission, and review of the IEE and the EIA reports. Categorization of projects for IEE and EIA is one of the main components of these regulations. Projects have been classified on the basis of expected degree of adverse environmental impact.

Based on Khyber Pakhtunkhwa Environmental Assessment Rules, 2021 provides screening categories of projects for which IEE or EIA need to be conducted. The proposed Project falls under the Category 'D' of "Transport" of the Schedule II. This category requires an EIA study to be conducted for obtaining NOC from EPA, Khyber Pakhtunkhwa.

The regulations stipulate that within ten (10) working days of the IEE or EIA study having been submitted, the concerned provincial agency will confirm that the document submitted is complete for the purpose of review. During this time, should the agency require the proponent to submit additional information, it will return the IEE or EIA to the proponent for revision, clearly listing those aspects that need further discussion. Subsequently, the concerned Provincial EPA would make every effort to complete an IEE review within forty-five (45) days and an EIA review within ninety (90) days of filing.

The prescribed procedure for review of EIA by the EPA is described in Khyber Pakhtunkhwa Environmental Assessment Rules, 2021 and is depicted in **Figure 2.1**.

Article 13(4) of Khyber Pakhtunkhwa Environmental Protection Act, 2014 binds the concerned EPA to communicate its approval or otherwise within a period of four months from the date the IEE or EIA study is filed, complete in all respects in accordance with the prescribed procedure, failing which the IEE study or, as the case may be, the EIA study shall be deemed to have been approved, to the extent to which it does not contravene the provisions of this Act and the rules and regulations made thereunder.

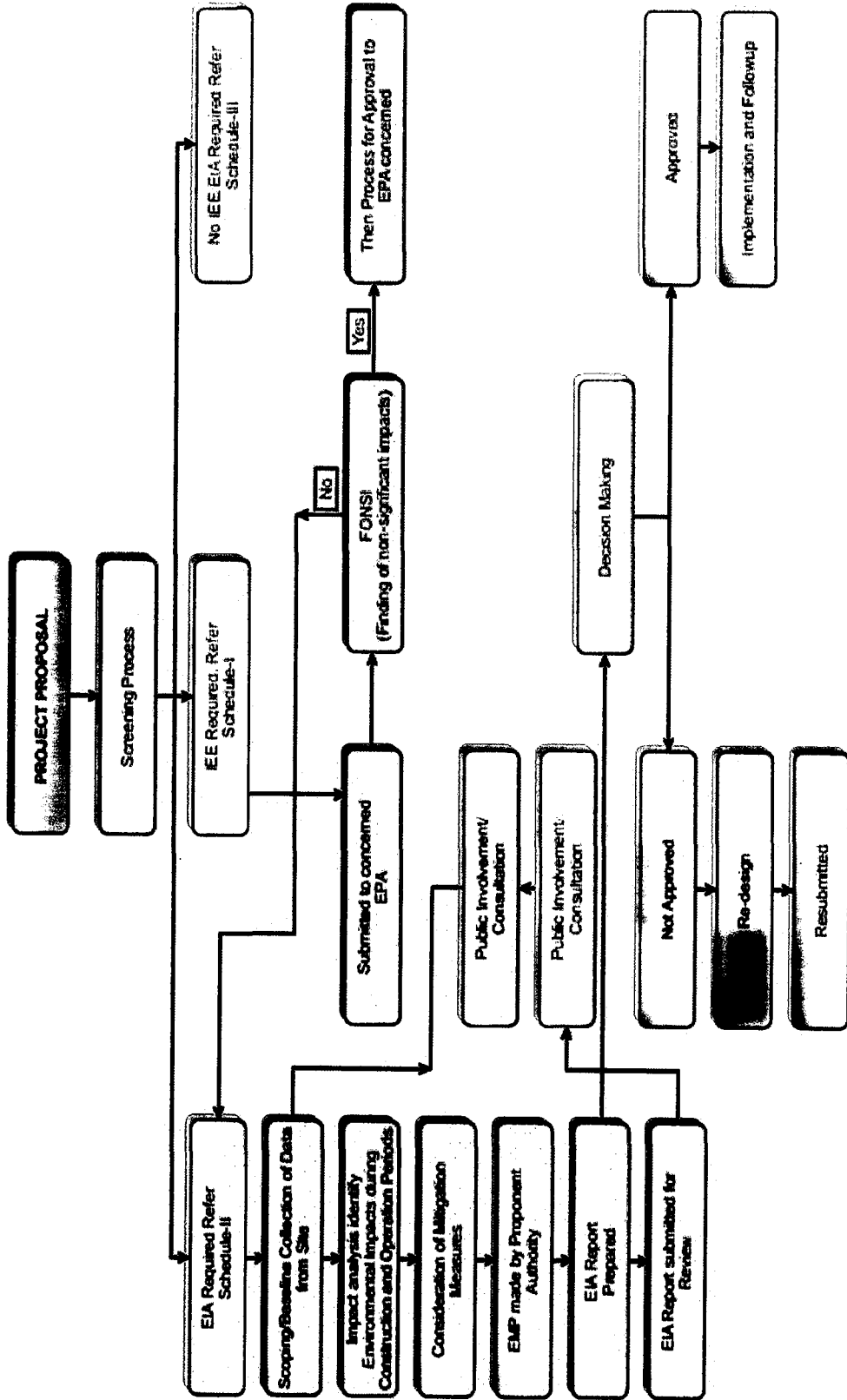


Figure 2.1: Procedure for Submitting the EA Report

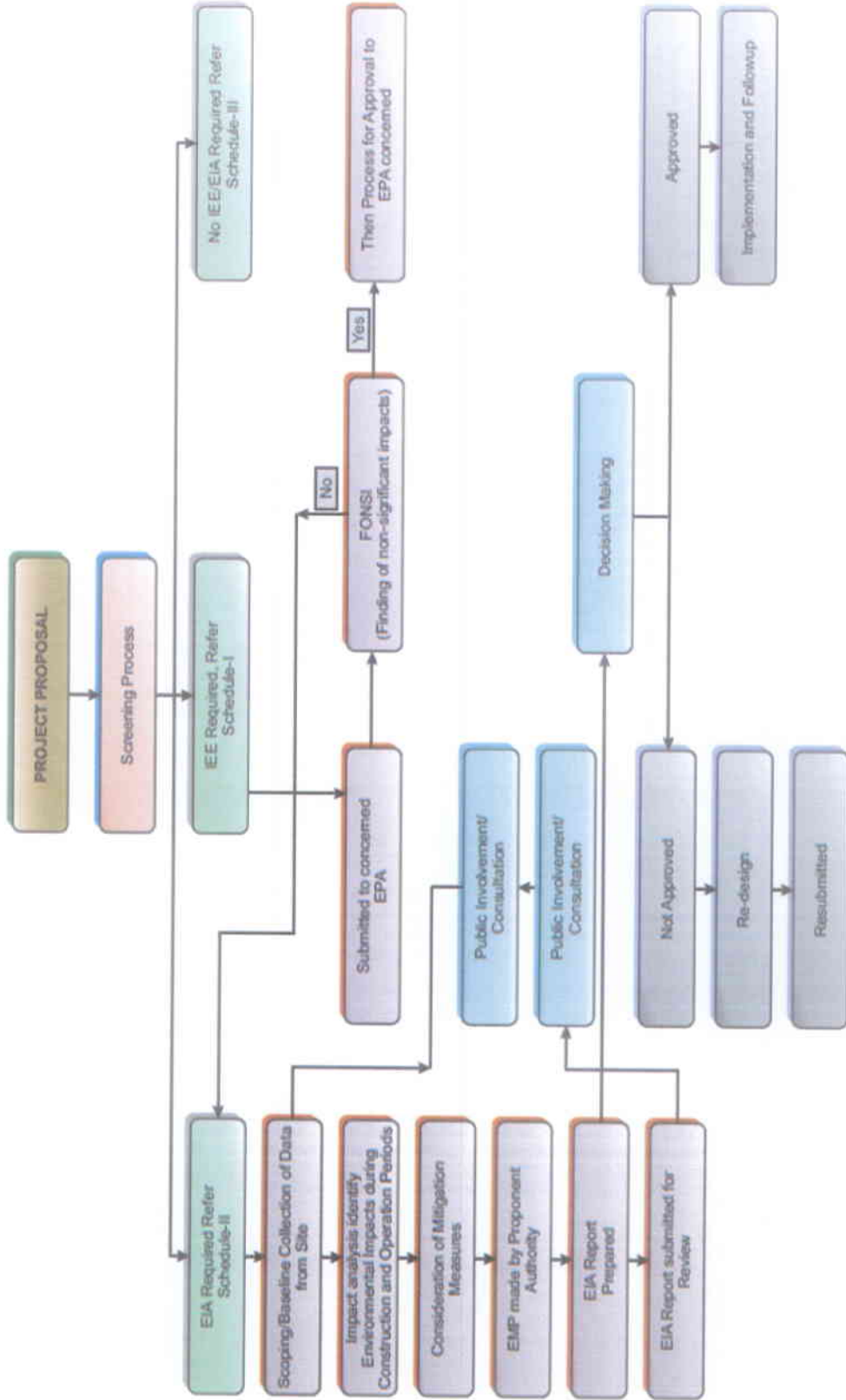


Figure 2.1: Procedure for Submitting the EA Report



2.4 INTERNATIONAL PROTOCOL/CONVENTIONS

As Pakistan is a member of a number of international organizations such as United Nations Organization (UNO), Organization of the Islamic Conference (OIC), South Asian Association for Regional Cooperation (SAARC), Economic Cooperation Organization (ECO) etc., so it has to follow the international protocols and obligations related to the environment. The major protocols, ratification dates by Pakistan and obligations related to the proposed Project are provided in the Table 2.3 below.

Table 2.3: International Agreements/Conventions Relevant to the Project

Sr. No.	Agreement/ Convention	Ratification	Description/Relevance
1.	UNESCO Convention on the Protection of the World's Cultural and Natural Heritage, 1972	Pakistan ratified this convention on 23 July 1976.	<p>Convention concerning the Protection of the World Cultural and Natural Heritage - requires parties to adopt a general policy on the protection of the natural and cultural heritage, to set up services for such protection, to develop scientific and technical studies, to take appropriate legal, technical, scientific and administrative measures and to foster training and education for such protection.</p> <p>The proposed Project design and EIA team paid due attention to archaeological sites and local norms. Both of these factors will also be considered during project implementation.</p>
2.	Convention on the International Trade of Endangered Species (CITES), 1975	Pakistan signed the Convention in 1973 and ratified it in April 1976.	<p>The convention entered in to force on 1 July 1975. The principal obligations of contracting parties to the CITES are to safeguard the trade in rare or endangered species and it established a permit system to control imports and exports of wild fauna and flora. According to this convention, species threatened with extinction whose movement between countries is prohibited except for conservation purposes such as captive breeding, species whose commercial trade is permitted but export permits are needed.</p>
3.	Convention on Conservation of Migratory Species of Wild Animals, 1979	Pakistan signed this convention in 1981 and ratified it in December 1987.	<p>Convention on the Conservation of Migratory Species deals with the conservation and protection of the migratory species. Species covered in the Convention should be given special attention during EIA and monitoring and any impacts identified should be mitigated to acceptable levels. There are no endangered species of plant life or animal life in the vicinity of the Project Area.</p>



Sr. No.	Agreement/ Convention	Ratification	Description/Relevance
4.	The Rio Declaration, 1992	Pakistan signed the treaty on 13 June 1992 and ratified on 1 June 1994	The Rio Declaration comprises 27 principles which address important issues such as; sustainable development to integrate environmental protection into the development process; common but differentiated responsibilities to conserve, protect and restore the earth's ecosystems; public participation and information access at the national level, reduce and eliminate unsustainable patterns of production and consumption.
5.	Kyoto Protocol, 1992	Pakistan has ratified Kyoto Protocol in 2005	The Kyoto Protocol is a protocol to reduce Greenhouse gases that cause climate change. It was agreed on 11 th December, 1997 at the 3 rd Conference of the countries to the treaty when they met in Kyoto, and entered into force on 16 th February, 2005. As of November 2007, 175 countries have ratified the protocol. One hundred and thirty-seven (137) developing countries have ratified the protocol, including Brazil, China, India and Pakistan but have no obligation beyond monitoring and reporting emissions.
6.	Convention on Biological Diversity, 1994	Pakistan signed this treaty in 1992 and it was ratified by cabinet in 1994.	The Convention on the Biological Diversity (CBD) has three main goals: Conservation of biological diversity (or biodiversity); sustainable use of its components; and fair and equitable sharing of benefits arising from genetic resources.
7.	Basel Convention, 1994	In 1994, Pakistan signed Basel Convention that restricts trans-boundary movements of "Hazardous Waste and their Disposal" with aim to protect human health and surrounding environment by minimizing the use of hazardous waste production.	The proposed Project will not be necessitating the endowment of this convention.
8.	UN Convention to Combat Desertification (UNCCD), 1994	Pakistan signed the Convention on 15th October 1994 and ratified it on 24 February, 1997	The UNCCD is a Convention to combat desertification and mitigate the effects of drought through national action programs that incorporate long-term strategies supported by international cooperation and partnership arrangements.



Sr. No.	Agreement/ Convention	Ratification	Description/Relevance
9.	Stockholm Convention on Persistent Organic Pollutants (POPs), 2004	The Stockholm Convention on Persistent Organic Pollutants was signed on 22 May 2001 and entered in to force on 17 May, 2004. Pakistan signed the convention on December 6, 2001	Convention seeks to protect human health and the environment from POPs as set out in Article 1, which are chemicals that remain intact in the environment for long periods, become widely distributed geographically and accumulate in the fatty tissue of humans and wildlife.
10.	Paris Agreement, 2015	The Paris Agreement's central goal is to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below two degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to one and half degrees Celsius. Additionally, the agreement aims to increase the ability of countries to deal with the impacts of climate change, and at making finance flows consistent with a low GHG emissions and climate-resilient pathway.	The implementation of the proposed Project will reduce the emission of greenhouse gases (GHG) due to the construction of the proposed Project.
11.	Sustainable Development Goals (SDGs)	Pakistan has displayed commendable commitment to the 2030 Agenda for Sustainable Development as it was one of the first countries to endorse it globally in 2015. On 16 th February 2016, the Parliament unanimously approved the Sustainable Development Goals (SDGs) as the national development agenda.	<p>The SDGs that will prevail for the proposed Project are as follows:</p> <ul style="list-style-type: none">• Promote Gender Equality and Empower Women: The contractor during construction phase will be responsible to hire women for construction activities to elude gender discrimination and to promote women empowerment.• Combat HIV/AIDS Malaria and Other Diseases: Contractor will be responsible to conduct medical surveillance of the workers before hiring to combat HIV/AIDS Malaria and other diseases. <p>Ensure Environmental Sustainability: Contractor will be responsible to ensure environmental sustainability of the</p>



Sr. No.	Agreement/ Convention	Ratification	Description/Relevance
			proposed Project Areas by ensuring implementation of EMP to mitigate adverse environmental impacts from construction activities during construction phase.

2.5 ADMINISTRATIVE FRAMEWORK

2.5.1 National Highway Authority (NHA)

The implementing agency of the proposed Project is NHA. The management of NHA through PMU will ensure that all the proposed measures are effectively implemented at the design, construction and operational stages.

2.5.2 Environmental Protection Agency (EPA), Khyber Pakhtunkhwa

For the proposed Project, EPA Khyber Pakhtunkhwa will be responsible for reviewing the report, issuing NOC and overall/broad based monitoring of the proposed Project activities.



3 PROJECT DESCRIPTION

3.1 GENERAL

The section provides information on justifications of the project, project components, design details, cost and other details on the project.

3.2 RATIONALE OF PROJECT

N-5, is Pakistan's longest highway running from the port city of Karachi to the border crossing at Torkham. It runs north from Karachi located in Sindh province to Hyderabad, Moro and Khairpur before crossing into Punjab province where it passes through Multan, Sahiwal, Lahore, Sheikhpura District, Gujranwala, Gujrat, Jhelum and Rawalpindi. At Rawalpindi, it turns eastwards and passes through Attock Khurd before crossing the Indus River into Khyber Pakhtunkhwa to continue through Nowshera and Peshawar before entering the Khyber Pass and reaching the border town of Torkham. All the major cities contribute in feeding regular and freight traffic on this highway. One of the major sections on National Highway (N-5) where traffic congestion exists due to all type of traffic is between Peshawar (Chamkani) to Nowshera. North bound traffic from the southern Pakistan traversing on National Highway (N-5) passes through major cities crosses Chamkani which is located alongside N-5 at about 82 mi (or 133 km) west of Islamabad. After traversing through small towns like Taru Jabba, Pabbi and Amangarh, N-5 crosses Nowshera which is located on N-45.

In recent years, Stretch of the N-5 between the cities of Chamkani and Nowshera has shown lot of urban development on both sides of N-5, that's why traffic remains jammed for hours in peak hours. Therefore, Chamkani- Nowshera section of N-5 has become a point of congestion with slower speeds, longer trip times, and increased vehicular queuing due to very dense urbanization in this area along N-5 especially at the locations of Pabbi, Tarru jabba and Amangarh. The traffic of Nowshera-Chitral road (N-45) also uses Nowshera Chamkani Section of N-5. After the launch of CPEC project, Rashakai town of Nowshera is now an Economic Zone of KP which has also attracted traffic.

As demand has approached capacity, NHA intends to provide additional lanes on each side of N-5 (32 Km approximately) between these two cities which will eliminate traffic problem, allow smooth traffic flow, reduce accidents, time saving and improved operating cost.

3.3 OBJECTIVES OF THE PROJECT

The construction of N-5 from Chamkani to Nowshera is a new initiative of the Government of Pakistan to meet the following objectives:

- Reduction in vehicle operating cost and travelling time;
- Congestion free route for traffic;
- Reduction in accident ratio;
- Job opportunities for locals of area; and
- Transportation of freight from Chamkani to Nowshera and onwards.



3.4 PROJECT BENEFITS

Following tangible and intangible benefits are expected from the operation of proposed Project:

- Traffic likely to be directly benefited due to proposed Project;
- Time savings due to elimination of delay;
- Fuel savings due to elimination of delay;
- Fuel save due to improvement of operational speed;
- Time saved due to improvement of speeds; and
- Reduction in vehicle operating costs (VOC) by reduction in wear and tear and fuel consumption.

3.5 PROJECT ADMINISTRATIVE JURISDICTION

The proposed Project falls under administrative jurisdiction of the District Nowshera and District Peshawar. The N-5 road starts from District Nowshera and ends at Tehsil Chamkani of Peshawar District which is around 32 Kilometers in length.

3.6 PROJECT LOCATION

Chamkani lies about 82 mi (or 133 km) west of Islamabad and Rawalpindi in Khyber Pakhtunkhwa. It is a tehsil of Peshawar and falls in the jurisdiction of Maintenance Unit, Peshawar. Nowshera is located in the Valley of Peshawar, lies on the bank of Kabul River, and is approximately 27 miles (43 km) east of the provincial capital Peshawar, along N-5. Refer Figure 1.1 for Project Location Map.

3.7 COMPONENTS OF THE PROJECT

The proposed Project involves the addition of extra lane of 3.65 m on each sides of the Chamkani-Nowshera Section of N-5 road. It also involves the extension of existing structures which contain all the bridges, culverts, flyover and relocation of existing drains and existing utilities.

3.8 LAND ACQUISITION

No land acquisition is involved, as the proposed lane of 3.65 m on each side of the road will be added within the existing RoW.

3.9 ACCESSIBILITY OF THE PROJECT AREA

The alignment of proposed Project is inter-connected with various existing roads that includes Nehar Road, Inqilab Road, Cherat road, Kaka Saib-Nowkahr Road and Motorway (M-1). Project Area Accessibility Map is shown in Figure 3.1.



(This Space is intentionally left Blank)

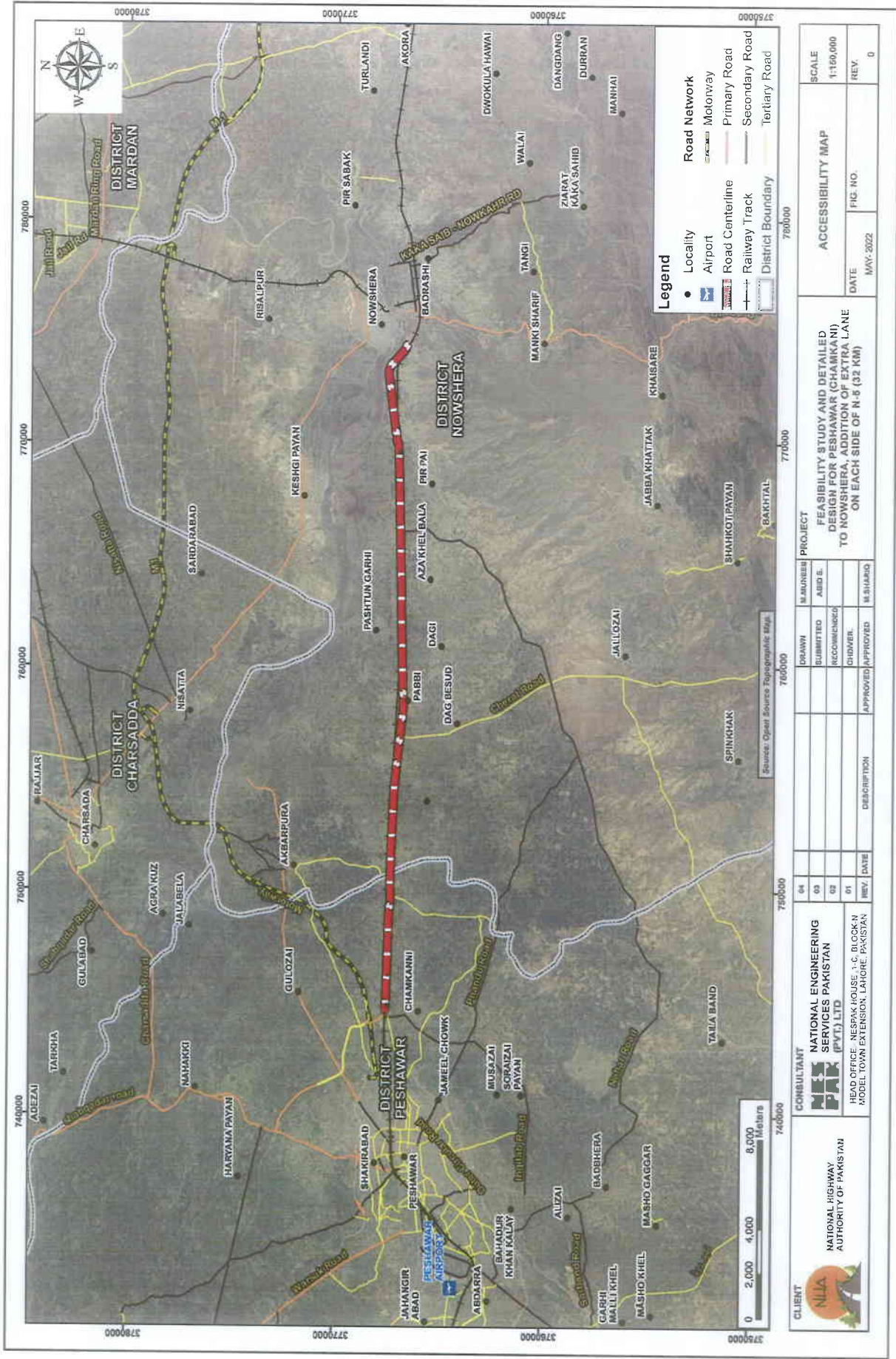


Figure 3.1: Project Area Accessibility Map



3.10 TRAFFIC STUDY

Detailed traffic survey has been carried out at three locations in January 2022. Classified Traffic surveys were carried out at following three locations to capture the potential traffic using the section of N-5 from Chamkani to Nowshera.

- TC-1 Near PSO Station, Chamkani;
- TC-2 Near Riyan Auto Decoration, Pabbi; and
- TC-3 Near Islamabad Motor Workshop.

Traffic forecasts have been prepared for 20 years for proposed road to best estimate the future traffic forecast. The AADT for project traffic for 20 years is provided in **Table 3.1**.



Table 3.1: Total Projected Traffic Project

DESIGN YEAR	YEAR/ VEHICLE TYPE	TRUCK						PASSENGER BUSES	TRACTOR TROLLEYS	MINI BUSES/ VANS/ PICKUPS	CARS/ JEEPS	MOTORCYCLES/ RICKSHAW	GRAND TOTAL (AADT)
		2- Axle	3- Axle	4- Axle	4-Axle Articulate d	5- Axle	6- Axle						
AADT	2022	2680	1816	351	6	68	402	236	198	5974	12123	7611	31,466
Const. Perfod	2023	2787	1889	365	7	71	420	246	207	6242	12668	7916	32,820
	2024	2899	1964	379	7	74	439	258	217	6523	13238	8233	34,232
1	2025	3015	2043	394	7	78	459	269	226	6817	13834	8562	35,705
2	2026	3136	2125	410	8	81	480	281	237	7124	14457	8904	37,241
3	2027	3261	2210	427	8	85	501	294	247	7444	15107	9260	38,844
4	2028	3391	2298	444	8	89	524	307	258	7779	15787	9631	40,517
5	2029	3527	2390	461	8	93	547	321	270	8129	16498	10016	42,261
6	2030	3668	2485	480	9	97	572	335	282	8495	17240	10417	44,081
7	2031	3815	2585	499	9	101	598	350	295	8877	18016	10833	45,979
8	2032	3967	2688	519	9	106	625	366	308	9277	18826	11267	47,959
9	2033	4126	2796	540	10	111	663	383	322	9694	19674	11717	50,025
10	2034	4291	2908	561	10	116	682	400	337	10131	20559	12186	52,161
11	2035	4463	3024	584	11	121	713	418	352	10587	21484	12674	54,429
12	2036	4641	3145	607	11	126	745	437	368	11063	22451	13181	56,774
13	2037	4827	3271	631	12	132	779	456	384	11561	23461	13708	59,221
14	2038	5020	3402	657	12	138	814	477	401	12081	24517	14256	61,774
15	2039	5221	3538	683	12	144	850	498	419	12625	25620	14826	64,437



16	2040	5430	3679	710	13	151	888	521	438	13193	26773	15419	67,215
17	2041	5647	3826	739	14	157	928	544	458	13786	27978	16036	70,114
18	2042	5873	3979	768	14	164	970	569	479	14407	29237	16678	73,138
19	2043	6108	4139	799	15	172	1014	594	500	15055	30553	17345	76,292
20	2044	6352	4304	831	15	180	1059	621	523	15733	31927	18038	79,583



3.11 DESIGN ASPECT

Following is the brief description of the design aspects of the proposed Project.

3.11.1 Design Criteria

Following is the brief description of the design aspects of the proposed addition of extra lane on each side of N-5:

Design Speed (plain)	120 Km/hr for Highway and 80 Km/hr for Flyover
Minimum Turning Radius (against 120 KPH)	756 m
Minimum Turning Radius for Flyover (against 80 KPH)	330 m
Absolute Minimum Curve Radius at Turnings/Channelizing Islands	22 m
K value for Crest (against 120 KPH)	95
K value for Sag (against 120 KPH)	63
K value for Crest (against 80 KPH)	39
K value for Sag (against 80 KPH)	38
No. of additional Lanes	1 on each side
Lane Width	3.65 m
Outer Shoulder	2.5 m+0.5 m rounding
Inner Shoulder	1 m
No. of Structures	Flyovers =02 Nos. Bridges= 18 Nos. Culverts = 5 Nos.
Maximum Gradient	4%
Maximum Super Elevation	6%
Minimum Gradient	0.25%

Cross-section of the proposed Project is attached as **Figure 3.2-3.5**.

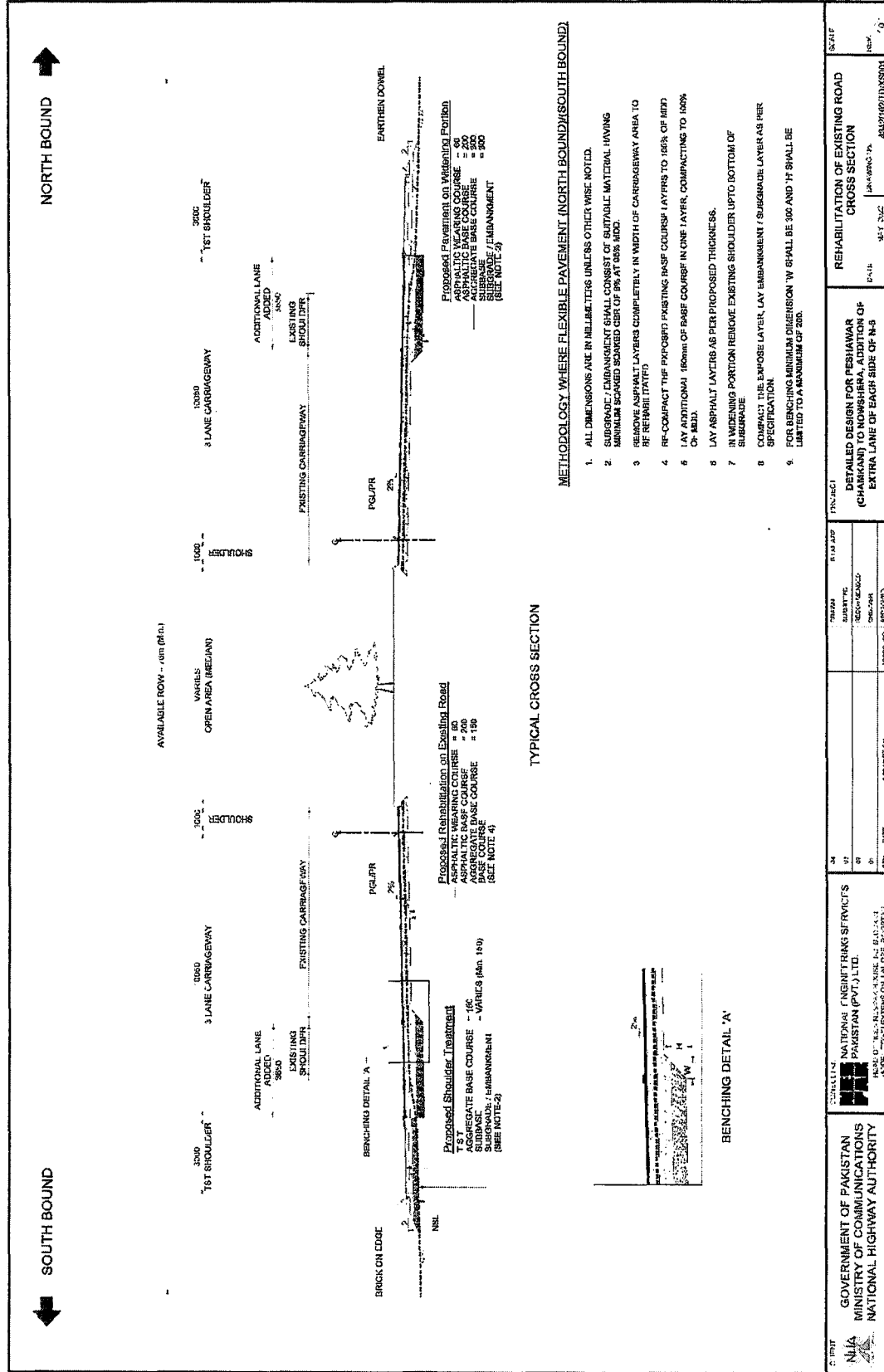


Figure 3.2: Cross Section of Rehabilitation of Existing Road

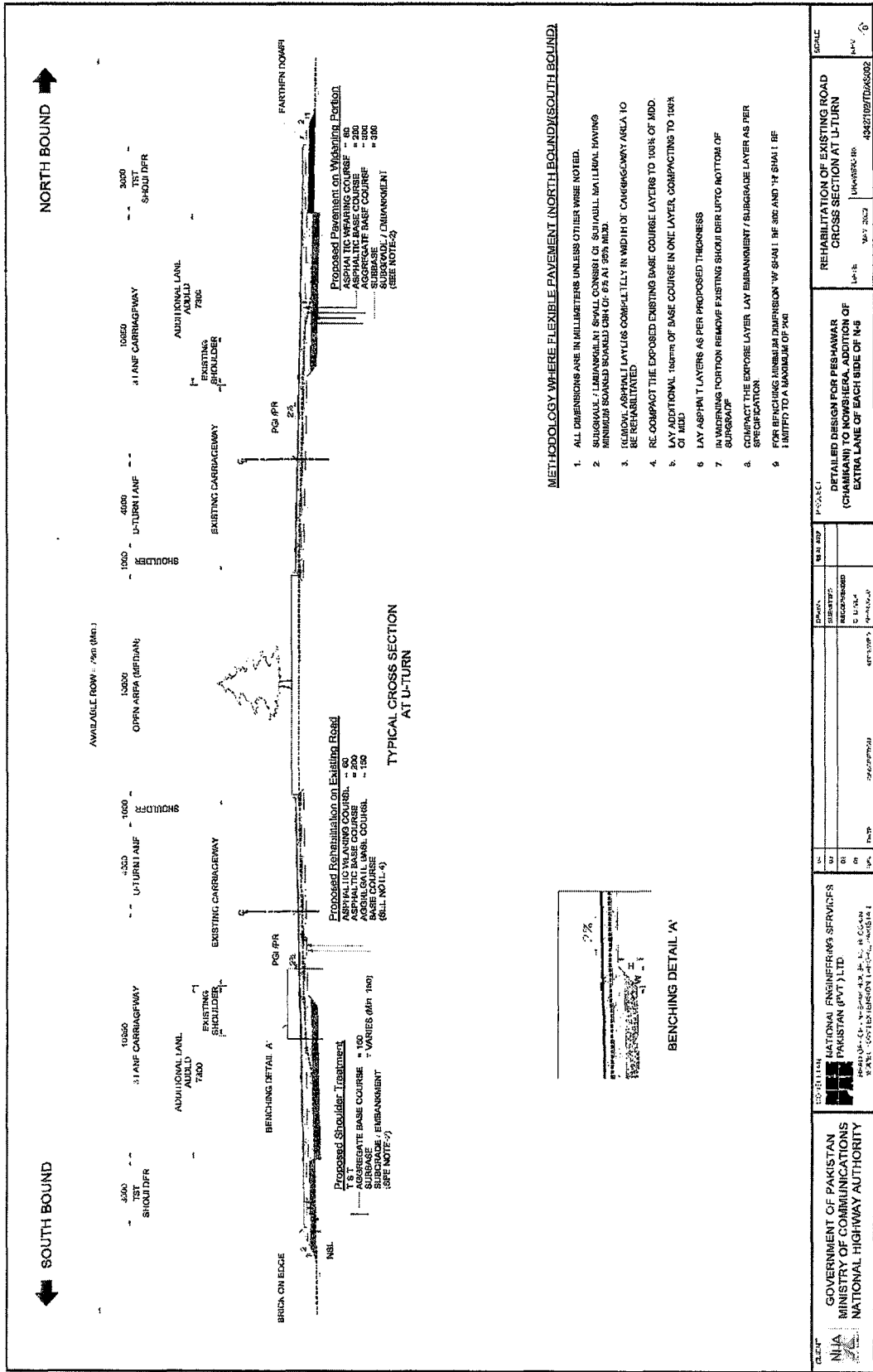


Figure 3.3: Rehabilitation of Existing Road Cross section at U-turn

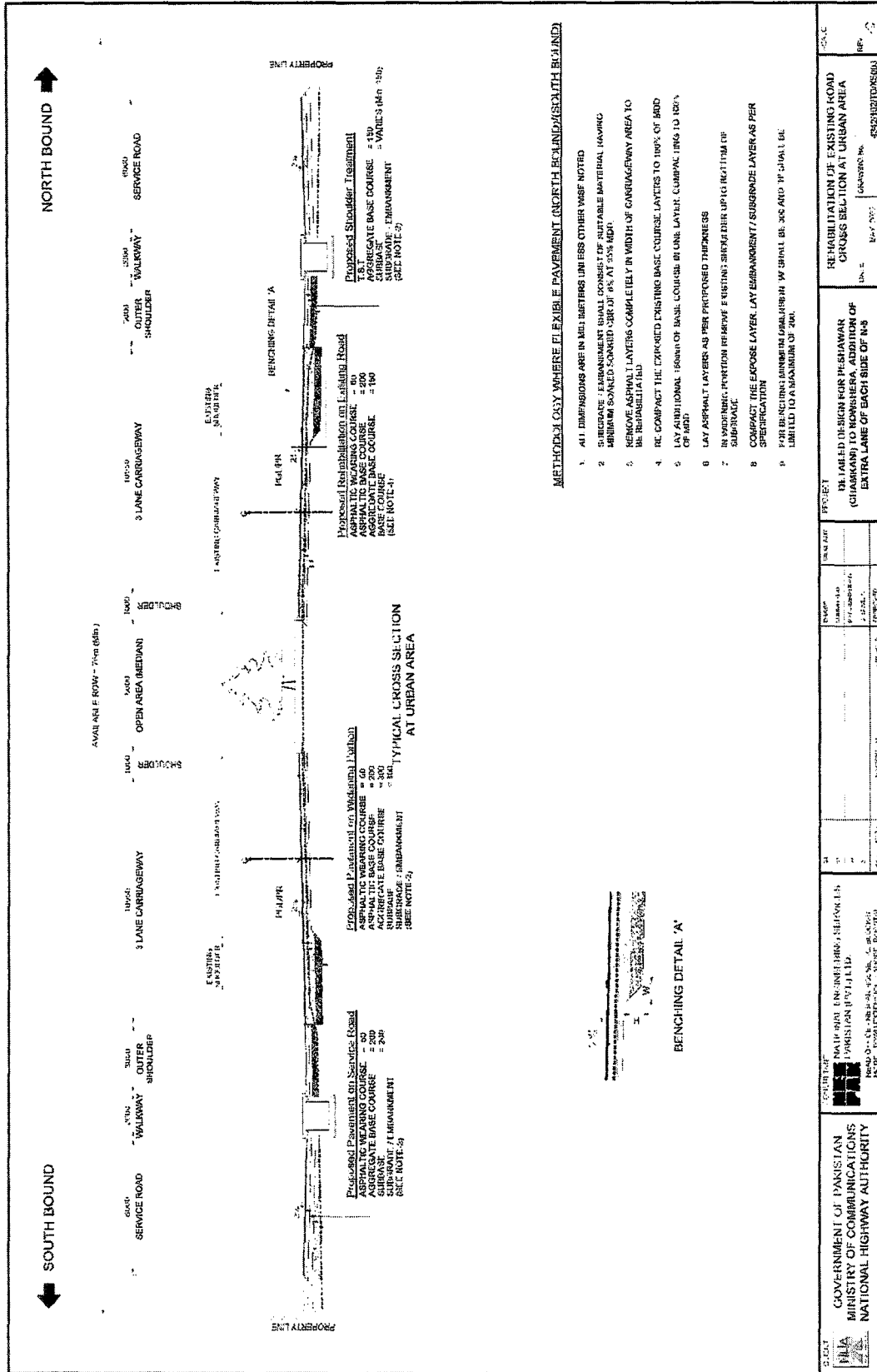


Figure 3.4: Rehabilitation of Existing Road Cross section at Urban Area

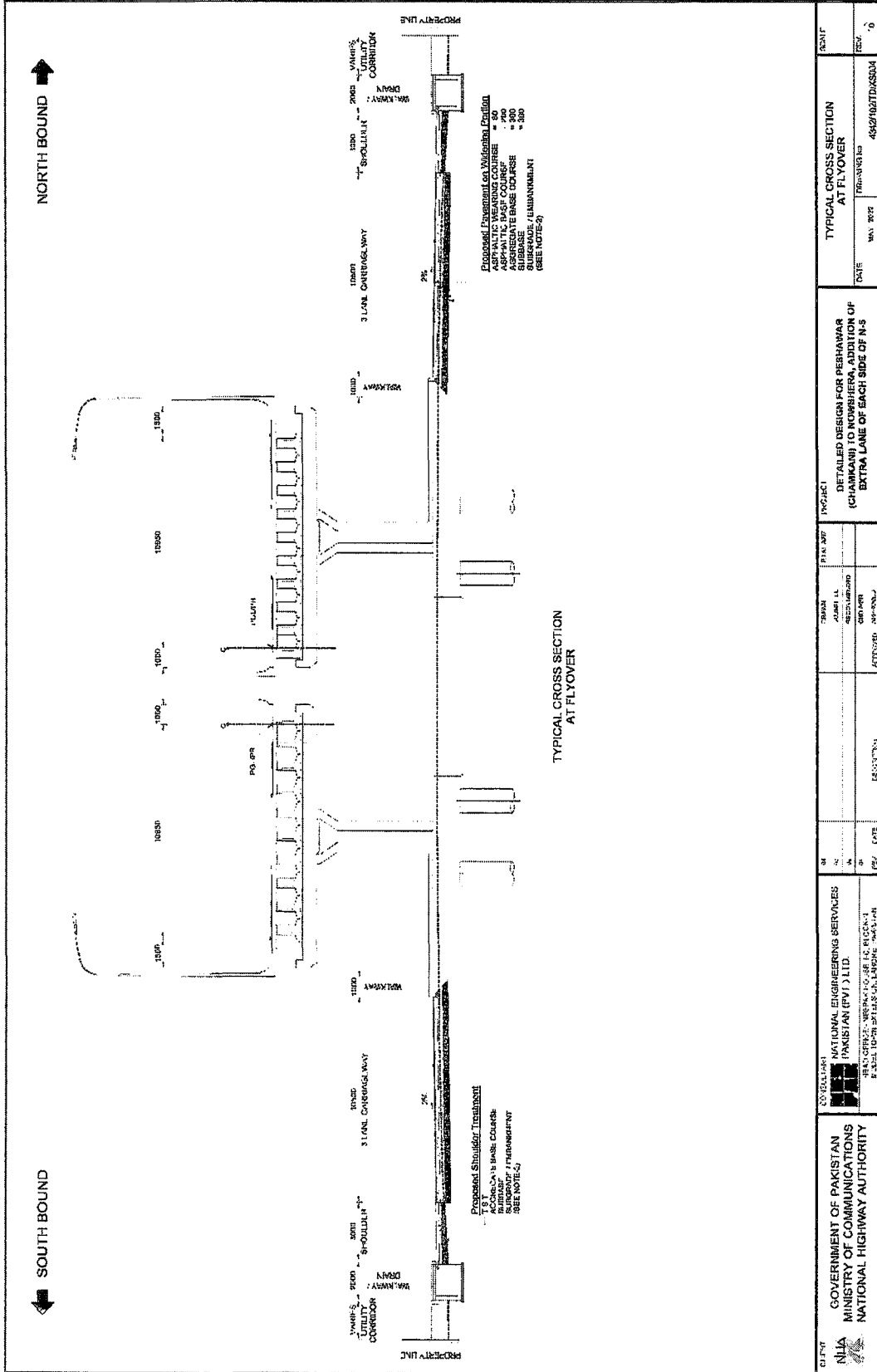


Figure 3.6: Rehabilitation of Existing Road Cross section at Flyover



a) Codes and Standards

The following codes and standards have been considered and adopted for the design of the project road:

- BCP (2007) - Building Code of Pakistan;
- WPCPHB (1967) - West Pakistan Code of Practice for Highway Bridges;
- American Association of State Highway and Transportation Officials (AASHTO) LRFD - AASHTO LRFD Bridges Design Specification;
- BRIDGES (2012) (For the design of all structural members);
- ASD combination for the calculating length of pile;
- ACI 318-08 - Building Code Requirements for Reinforced;
- ACI 301-95 - Specifications for Structural Concrete American Concrete Institute;
- ASTM A-615 - Specifications for Deformed and Plain Billet;
- Steel Bars for Concrete Reinforcement;
- ASTM C-150 - Specifications for Portland cement;
- ACI-350 R - Environmental Engineering Concrete Structures;
- ASTM C-33 - Specifications for Concrete Aggregate; and
- UBC 1997 - Uniform Building Code (UBC) of USA.

b) Loads

Structures designed will be capable of resisting the following main loads and forces:

- Dead Load;
- Live Load;
- Impact/ Dynamic Allowance;
- Vehicle Collision Force;
- Wind Load;
- Longitudinal forces due to tractive/braking effort of vehicles;
- Earth Pressure; and
- Earthquake Forces.

3.12 CONSTRUCTION ASPECTS

3.12.1 Construction Materials

The materials used for construction purpose would include coarse aggregates (crush), fine aggregates (sand), steel, water, asphalt, reinforcement, cement etc.

a) Aggregate

Aggregate for Subbase, base course, concrete and asphalt will be produced from Takhta Beg and Sadu Khel rock quarries by jack hammer excavator/ blasting method. These two quarries are sedimentary rock in nature (Limestone formation) and crush produced from these two sources without producing a significant amount of flat and elongated particles. Boulders/ gravel obtained from Nullah deposits, aggregates of desired size can have produced a significant amount of flat and elongated particles. However, aggregates produced by crushing



state contain a considerable amount of flat and elongated particles. The inclusion of slate if any may therefore be avoided during blasting and crushing.

In addition to above mentioned sources in provinces of KP and Punjab in close vicinity of the project road weer also analyzed. These sources are located in Margalla Hills, Pezu Near D.I Khan and also near D.G Khan Cement Factory, D.G Khan, Margalla Hills limestone l the near source to the main Grand Trunk (GT) road which is widely used in construction project in KP, Punjab and also met the project specification requirements.

b) Cement

Both Ordinary Portland Cement (OPC) and Suphate Resistance (SRC) would be the requirements for the construction of concrete structure of this project.

The nearest cement factories from where the ordinary Portland cement can be produced are given below:

- Askari Cemente limited-Hattar, KP;
- Cherat cement company limited- Nowshera, KP (also used in Bus Raid Transit (BRT) Peshawar);
- Dewan hattar cement limited-hattar, haripur, KP (also used in BRT Peshawar);
- Kohat cement company limited-kohat, KP; and
- Bestway cement limited-Farooria, KP.

c) Steel

Steel (g-60) will be the requirements for the construction of concrete structure of the project. The nearest steel mills from where the steel can be procured area given below:

- Frontier Foundry Steel (FF) Peshawar, KP (used in BRT Peshawar);
- SGI Steel (Siddiqui Group of Industries), Islamabad (used in BRT Peshawar);
- Pak steel Re-rolling mill, Islamabad; and
- Mughal Steel Karachi

3.12.2 Work Force

Man power demand estimation is an essential component to facilitate deployment of manpower. Total man power required for the proposed Project will be estimated by the contractor at construction stage, whereas as per consultant's previous experience the workforce for proposed Project has been estimated as 100 workers including skilled and unskilled labourers.

3.12.3 Construction Activities and Required Machinery

Construction activities involve following:

- Earth work (clearing of vegetation/ trees and top soil);



- Roadwork (Levelling, preparation of sub grade, sub base, base and wearing course); and
- Structure works.

The list of the machinery and the equipment required for the proposed Project is provided in Table 3.2.

Table 3.2: Machinery and Equipment Requirement

Sr. No.	Type of Machinery/ Equipment	Sr. No.	Type of Machinery/ Equipment
1	Bulldozer	12	Rollers
2	Excavator	13	Tandem
3	Dump Trucks	14	Vibratory Combination Rubber Mounted Tandem Roller
4	Grader	15	Crane
5	Grader with Scarifier	16	Beam Launching Truss
6	BackHoe	17	Piling Equipment
7	Water Tanker	18	Vibrator for Concrete
8	Front End Loader	19	Road Marking Machine
9	Paver	20	Concrete Batching Plant
10	Power Broom	21	Asphalt Premix Plant
11	Bitumen Pressure Distributor	22	Laboratory with Equipment (1 permanent & 1 mobile)

3.12.4 Construction Camps

Camp sites will be selected keeping in view the availability of adequate area for establishing camp sites, including parking areas for machinery, stores and workshops, access to communication and local markets, and an appropriate distance from sensitive areas in the vicinity. Keeping in view the following criteria guidelines, the Contractor has to identify the construction camp sites before start of the construction activities:

- There should be no resettlement issue for the location of the camps;
- Camp site should be away from the residential areas and sensitive receptors;
- Selection of sites for construction camps shall be near the project area having proper access to the nearby main/link road;
- The camps must be located in a place where the drainage from and through the camps will not threaten any domestic or public water supply;
- Camp site must be adequate in size to prevent overcrowding of necessary structures;
- The camp site should consider avoiding any damage of property, vegetation, irrigation, and drinking water supply systems;
- The camp site must not be subject to periodic flooding; and
- There should not be any ecological sensitive areas e.g. wildlife sanctuaries, game reserves, national parks, forest areas, etc. near to the construction camp site.

3.12.5 Water Requirement



The source of water during the construction phase will be from water bowser tanks and ground water / bottled water (for workers/skilled and unskilled labor) from local sources will be used. The depth of the ground water table is along the Kabul and Indus Rivera and in Canal irrigated area is generally less than 10 m while it is more than 30 m in higher elevations. The water consumption is estimated to be 4,000 liters /day² for 100 construction workers for the proposed Project.

3.12.6 Wastewater Generation

The wastewater generation is estimated to be 3,200 liters/day for 100 construction workers for the proposed Project.

3.12.7 Solid Waste Estimation

Due to construction activities waste will be generated at construction site and contractors camp. The contractor will provide the estimated quantity of excavation material during the construction phase. These wastes will be generated due to the construction activities and the up to the extent possible the excavated materials will be reused, where applicable, for construction purposed. Solid waste generated during construction and camp sites shall be safely disposed in demarcated waste disposal sites.

The solid waste generation is estimated to be 50 kg/day (as per 0.5 kg/capita/day waste generation)³ for 100 construction workers for the proposed Project.

3.12.8 Power Requirement/ Power Source

The main source of electricity/electric power during construction phase will be diesel generators for construction camps and construction machinery and during the operational phase it would be taken from main electric power grid, supplying power to the main city.

3.13 PROJECT IMPLEMENTATION SCHEDULE

The Implementation Schedule of proposed Project is two (02) years

3.14 COST OF THE PROJECT

Total cost of the Project is estimated to be around 10,819 Million PKR.

2. Tentative Work Force Requirements Including Client and Contractor Staff
= (100) x (40) = 4,000 liters/day
= (100) x (80% of water consumption) =3,200 liters/day

3. Source: The World Bank Report 2012 – What a Waste: A global review of solid waste management. Based on UNEP estimates for waste generation in the Asia Pacific. Average is 0.45 kg/capita/day



3.15 ALTERNATIVE ASSESSMENT

3.15.1 General

This section deals with an analytical overview of the different alternatives that have been considered for the proposed Project. The analysis has been carried out keeping in view the environmental and social aspects to select the most suitable alternative for the project. Two options have been considered for existing Chamkani - Nowshera section of N-5 Road which include;

- NPO; and
- Addition of an extra Lane on each side.

3.15.2 Alternative-I No Project Option

Chamkani- Nowshera section of N-5 has become a point of congestion with slower speeds, longer trip times, and increased vehicular queuing due to very dense urbanization in this area along N-5 especially at the locations of Pabbi, Tarru jabba and Amangarh. The traffic of Nowshera-Chitral road (N-45) also uses Nowshera Chamkani Section of N-5. After the launch of CPEC project, Rashakai town of Nowshera is now an Economic Zone of KP which has also drawn traffic.

The current capacity of road is not adequate for smooth flow of traffic. Moreover, the road condition is deteriorated. Traffic volume on the existing road is anticipated to increase with the passage of time as indicated from the traffic projection survey. Traffic congestion is expected to increase in the future and road conditions are expected to deteriorate due to ever increasing traffic volume. If no action is taken for this corridor, projected increase in traffic volumes will further increase dust, vehicular emissions, noise, traffic congestion and conflicts/accidents in the area.

The NPO considers continuation of utilizing existing road and no further development would be done. NPO may result in degradation of air, increase in noise pollution, vehicular emissions, noise, traffic congestion and conflicts/accidents in the area. The continuation of existing conditions of road will result in longer travel times. The deplorable conditions of road will result in wear and tear of vehicle and increased probability of accidents. Approach to the main city by nearby villages will remain difficult and access to better educational and health facilities will also remain limited. In case of emergencies, rescue services will also not reach easily to the affected areas or safe areas if needs evacuation.

Therefore, NPO conditions will result in further worsening of the present environmental and socio-economic conditions and increased disturbance to residents of the area and the road users.



3.15.3 Alignment Alternatives

a) Option-I: Addition of Lanes on outer side of the road (Utilizing existing ROW) along with elevated Flyover

Utilizing available RoW width and provision of additional lane on north / south bound on outer side along with provision of bypass option for major towns i.e. Pabbi & Tarujabba or elevated flyover option for through traffic in populated areas of Pabbi & Tarujabba along with minimum utilization of existing median width at locations of U-turns (if required) to avoid the involvement of minimum additional RoW. This will also involve extension of existing structures which contain all the bridges, culverts, flyover and relocation of existing drains and existing utilities. Overhead pedestrian bridges and Bus bays will have also been proposed at location of urban development.

Provision of flyover over N-5 at Tarujabba PSO depot for through traffic of N-5 with controlled crossing arrangement of oil tankers at grade with provision of service lanes will be a viable/economical option to cope with present conditions keeping in view the existing RoW.

Existing RoW was checked and found adequate keeping in view the design requirement for provision of extra lanes. Presently keeping in view available RoW, traffic capacity of Tarujabba bazaar can easily be increased by providing additional lanes on either side along with provision of service roads for local traffic. Option of bypass or elevated flyover option for through traffic in Tarujabba bazaar was also examined. Bypass for Tarujabba Bazaar area is impossible due to dense builtup area on north & south bounds of road as bypass at cost of high land acquisition and extreme disturbance to local business is not feasible.

Series of trees was also observed in this section at close distance from shoulder edge, which will be removed and placed again in lines with trees plantation plans under EMP while providing additional lanes on outer side on both north and south bounds.

Existing median width in this section tends to reduce at locations of U-turns only. Few U-turns locations were also observed incorrect with respect to their actual required locations, which have been examined and adjusted in detailed design. End point was also examined keeping in view the additional lanes on outer side of north & south bound roads. Minimum adjustments will be made with ramps of Chamkani interchange merging / diverging with N-5 keeping in view the additional lanes on outer side.

b) Option-II: Addition of Lanes on inner side of the road (Utilizing existing median width)

There is no difference in alignment of Option-I & Option-II except in Option-II, provision of additional lanes on N-5 was checked on inner side i.e. utilizing existing median width. Existing median width is 2m to 6m with 6m width in maximum length and reduced median width at U-turns locations. It was observed that width of 6m is not sufficient enough to provide two additional lanes of standards width of 3.65m as required width is 7.3m and available width is 6m, which further reduced at U-turns locations. It was observed that while providing lanes on inner sides utilizing existing median width, there will be constructability issues due to lack of space. Furthermore, in Option-II it was also observed that while utilizing existing median width for provision of additional lanes, massive trees / plantation in existing median all along the length will be disturbed severely. It is presently not only contributing to environment but also



providing comfort to commuters during night time glare. At structures locations i.e. culverts/bridges, it is not possible to add lanes on inner side due to lack of space and constructability issues.

c) Option-III: Bypass for Complete Chamkani to Nowshera Section of N-5

Option-III in contrary to Option-I & Option-II, is consideration of complete bypass option for Chamkani to Nowshera section of N-5. Terminal points i.e. start point and end point of bypass option were initially observed and were found non-feasible due to dense built-up area in Nowshera (start point) & Chamkani (end point). It was observed that on North of N-5 there exists Kabul River in close vicinity in initial few kilometers. On north bound of N-5, all along the Kabul River, there is built-up area. While moving towards Pabbi & Taru Jabba, same situation is observed, there are various towns which have been located all along the N-5 and have expanded towards north side. Same was the case on south bound, there is massive built-up area along with various business centers along road. Various towns have been expanded towards south in very uneven way. Bypass option for complete section of Nowshera to Chamkani was found non-feasible due to involvement of massive land acquisition and ultimately a huge social impact

d) Selection of Alignment

Selection of an alignment is usually governed by Short, Easy, Safe & Economical (SESE) rule. Factors which usually affect selection of road alignment are as under:

- **Length:** Shortest route gives lesser construction cost.
- **Curves:** Straight alignment usually gives higher speed to traffic and ultimately reduces the vehicle operating cost.
- **Gradient:** Alignment should be opted having good sight distances and lesser gradients, which provides commuters with safe and comfortable ride.
- **Avoidance of Natural Scenery / beauty area:** Alignment should be opted having no involvement of natural beauty area.
- **Avoidance of Forest:** Alignment passing through forest should be avoided as it will disturb the natural habitat of area.
- **Lesser Obstructions:** Alignment should be opted having less obstructions like ponds, lakes, wells, monumental building, historical places, religious places and country's sensitive installations.
- **Constructability:** Alignment should be opted having easy construction.
- **Connections with Major Towns:** Alignment should be selected which connects maximum population and villages in major.
- **Cost of Land:** Alignment should be selected having maximum utilization of existing tracks and lesser involvement of land.

Technical comparison of Option -I & Option -II is drawn only; however, Option -III (bypass option) being not feasible is not compared with Option -I & Option -II.



Table 3.3: Technical Comparison of Option-I and Option-II

Sr. No.	Description	Option-I	Option-II
1	Length (Approx.)	30.5 Km	30.5 Km
2	Curves	Only one major curve	Only one major curve
3	Gradient	Mild	Mild
4	Avoidance of Natural/ Landscape area	No involvement	No involvement
5	Avoidance of Forest Area	Disturbance to trees in existing median is minimum. Disturbance to trees existing on outer side is maximum	Disturbance to trees in existing median is maximum Disturbance to trees existing on outer side is minimum
6	Obstructions	No major obstruction	No major obstruction
7	Constructability	Easy to construct	Very difficult to construct and impossible at bridge structure locations
8	Connection with major towns	Yes	Yes
9	Land cost	Minor land cost will be involved at U-turn locations only.	No involvement of land

In light of above discussion, **Option-I** i.e. Utilizing available right of way width and provision of additional lane on north / south bound on outer side along with provision of elevated flyover option for through traffic in populated areas of Tarujabba along with minimum utilization of existing median width at locations of U-turns (if required) to avoid the involvement of minimum additional right of way is hereby suggested to be opted as it is easy to construct and minimum disturbance to existing available green median.



4 DESCRIPTION OF THE ENVIRONMENT

4.1 GENERAL

This chapter provides the description of the baseline conditions along the proposed Project within the Col and RoW, refer **Figure 1.2**.

Considering the potential impacts of the Proposed Project, existing baseline environmental conditions of the proposed Project's Col has to be used as a benchmark for comparison of the physical, ecological and socio-economic conditions before and after construction phases of the Project. This baseline will also provide the datum for assessing the impacts and suggesting the mitigation measures, which will be implemented effectively at various phases of the proposed Project activities.

4.2 FIELD VISITS FOR BASELINE STUDY

The data presented in the forthcoming sections has been collected from the primary and secondary sources. For primary data acquisition, the Environment and Social team conducted the field visit during the month of May 2022.

The major objective of the field visits was to collect the baseline data on physical, ecological and social aspects along with identification, assessment and categorization of the significant environmental and social impacts of the proposed Project. The secondary data was collected from published sources/reports and relevant departments, which were also verified through visual observations during detailed surveys.

4.3 PHYSICAL ENVIRONMENT

The following section provides an overview of the information on physical environment of the Col collected from primary as well as secondary sources. The major parameters covered include Topography, Geology, Seismicity, Soil, Climate, Water Resources, Ambient Air Quality & Noise, Solid Waste and Land-use along the proposed Project.

4.3.1 Topography⁴

Peshawar is situated near the eastern end of the Khyber Pass and falls mainly on the Iranian plateau along with the rest of the Khyber-Pakhtunkhwa. The Vale of Peshawar is covered with consolidated deposits of silt, sands and gravel of recent geological times. The cultivated tracts consist of rich, light and porous soil, composed of even mixture of clay and sand. The areas between the Kabul River and Budni Nala consist of flood Plains/Zones. The meander flood plain extends from Warsak in the Northwest towards Southeast in the upper Northern half of the district. The Kabul River enters the district in the Northwest. Topography of the proposed

⁴The data of Topography for Nowshera was extracted from ADB (June, 2016) Initial Environmental Examination Report of PAK: MFF Power Transmission Enhancement Investment Program Tranche 4- 220 KV Nowshera Grid Station and Allied Transmission Line



Project site is comprised of stretches of vacant land based on mostly flat terrain with scattered vegetation consisting of bushes, grasses and some trees across the site.⁵

The Nowshera district lies in border with Peshawar valley at an elevation of 295 m amsl. Nowshera District is largely barren with distant range of mountains in the background. Spin Khak is a Barani area where soil is prevalently sandy with gravel with clay on top. This makes it very suitable for ground water retention. Stratigraphically the rocks of the area are part of the Nowshera Formation of Stauffer. The Nowshera Formation consists of sandy dolomite, calcareous and dolomitic quartzite, calcareous argillite and fossiliferous limestone. The area has a rolling topography. **Figure 4.1** shows the Topography of the project area.

4.3.2 Regional Geology and Soil

Peshawar district comprises of unconsolidated surficial deposits of silt, sand and gravels. The central part of the district consists of fine alluvial deposits. The cultivated tracts consist of a rich, light and porous soil, compost of a pretty even mixture of clay and sand which is good for cultivation of wheat, sugarcane and tobacco.

Nowshera district is largely barren with distant range of mountains in the background. Spin Khak is a Barani area where soil is prevalently sandy with gravel with clay on top. This makes it very suitable for ground water retention. Stratigraphically the rocks of the area are part of the Nowshera Formation of Stauffer. The Nowshera Formation consists of sandy dolomite, calcareous and dolomitic quartzite, calcareous argillite and fossiliferous limestone. The geological map of the project area is shown in **Figure 4.2**

⁵ The data of Topography for Peshawar and Regional Geology was extracted from ADB (February, 2021) Project # 50136-002 Environmental Impact Assessment Report of Pakistan: Khyber Pakhtunkhwa Cities Improvement Project- Peshawar Solid Waste Management Facility (SWMF) Development

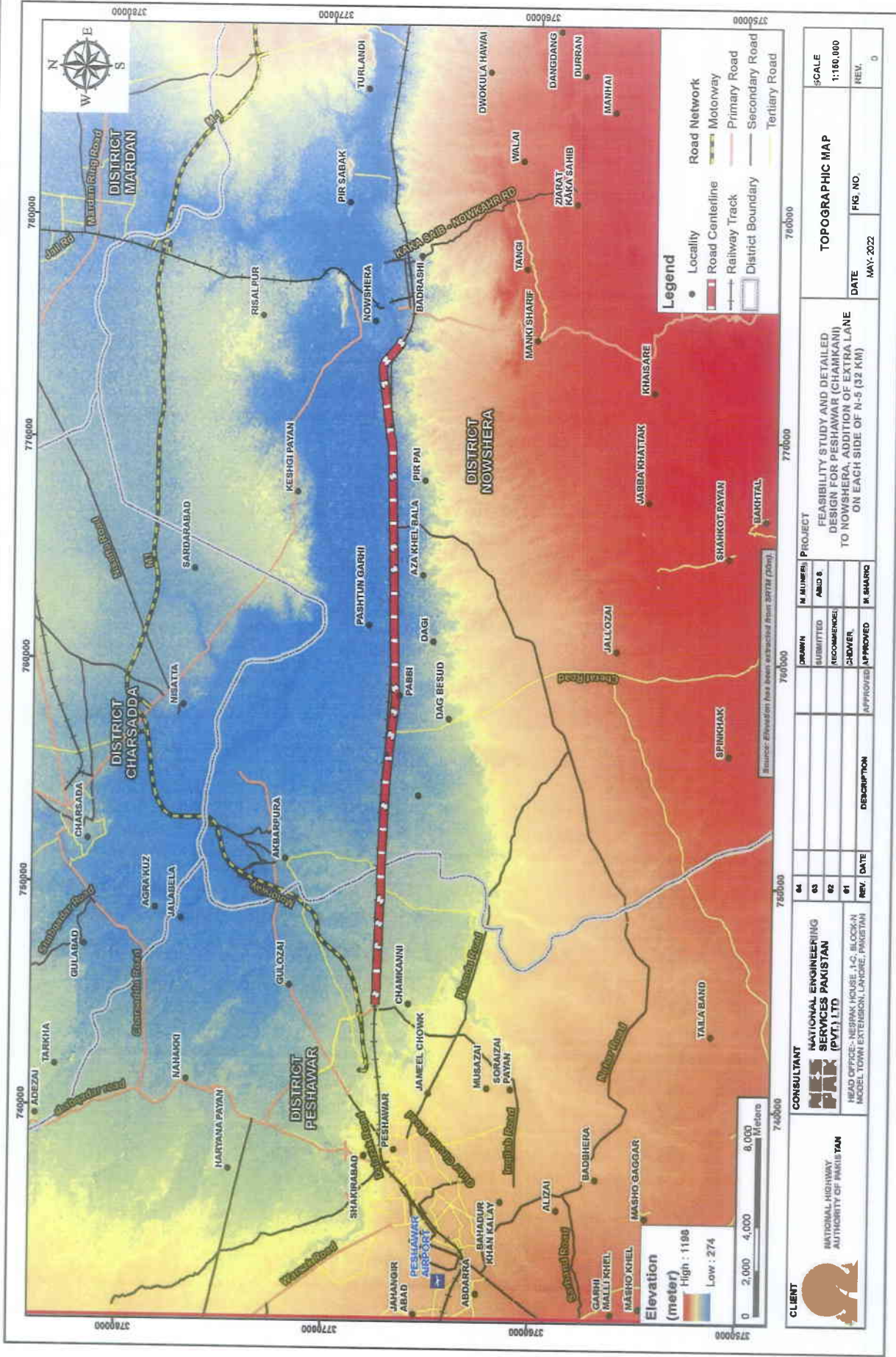


Figure 4.1: Topography of the Project Area

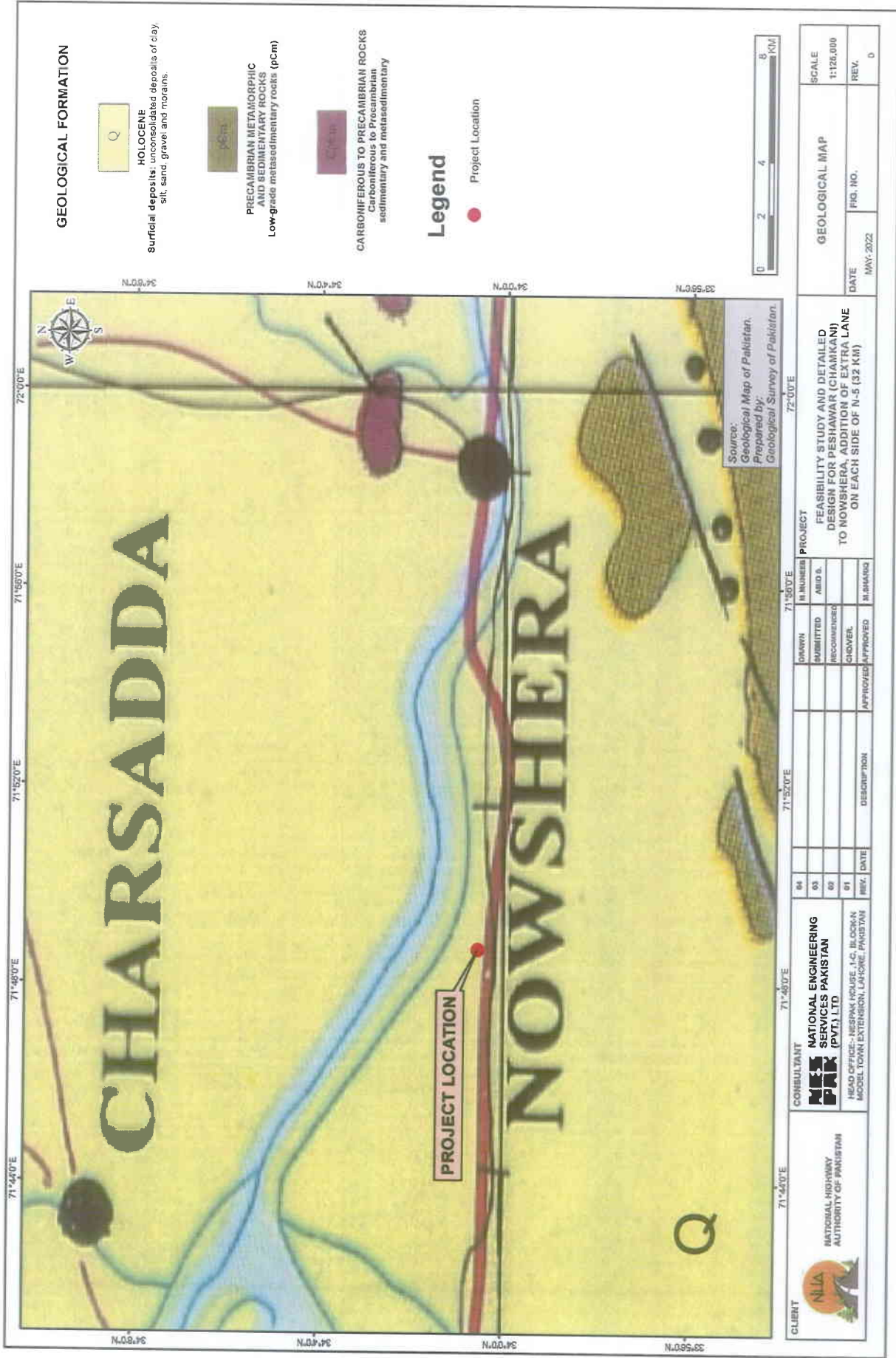


Figure 4.2: Regional Geological Map



4.3.3 Seismology

On the basis of Peak Ground Acceleration (PGA) values obtained through Probabilistic Seismic Hazard Assessment (PSHA), Pakistan is divided into five (05) seismic zones in line with the Uniform Building Code (UBC), 1997 of the Pakistan. The boundaries of these zones are defined on the basis as shown in **Table 4.1**.

Table 4.1: Values of Seismic Zones of Pakistan

Sr. No.	Zone	PGA (g)
1	1	0.05 to 0.08
2	2A	0.08 to 0.16
3	2B	0.16 to 0.24
4	3	0.24 to 0.32
5	4	> 0.32 g

In general, the Proposed Project as per Building Code of Pakistan (BCP), 2007 (Seismic Provisions) falls entirely in the zone-2B (Moderate Hazard) category with PGA 0.16 to 0.24g of the seismic zonation map as shown in **Figure 4.3**. Hence all the applicable provisions of BCP should be met during the design and construction for safety against seismic hazards.⁶

⁶ *Building Code of Pakistan (Seismic Provisions – 2007), Ministry of Housing and Works*

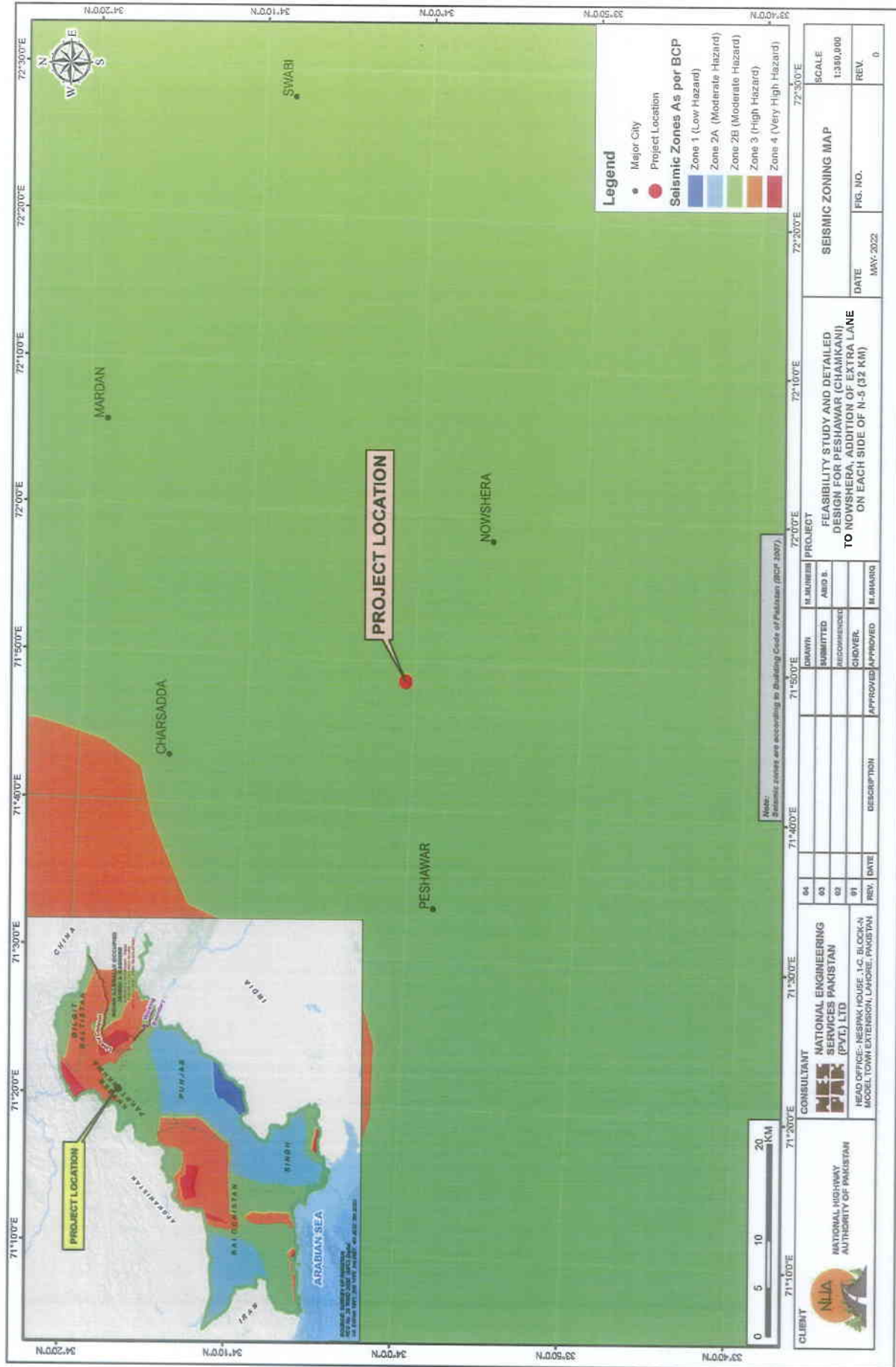


Figure 4.3: Seismic Zoning Map



4.3.4 Climate

Peshawar has a hot semi-arid steppe climate, which is very dry with little rainfall. It can rain at any time of the year but the rain does not last long. As well as being arid, the climate is extremely hot in the summer but slightly cooler in the winter months. There is no monsoon period. Throughout the year, temperatures fall dramatically at night, sometimes by as much as 20°C.

There is no meteorological station present in Nowshera District therefore reliance has been placed on the data available from the nearest meteorological station i.e. Peshawar, which is in the same climatic zone. In Nowshera, the summers are sweltering, humid, and clear and the winters are cool and partly cloudy.⁷

The monthly data for Temperature, Rainfall, Relative Humidity and Wind speed from year (1981-2010) for the above mentioned Weather Station for the Project Area are presented in subsequent section.

4.3.5 Temperature

The proposed Project area will be subjected to long periods of high temperature in summers and low temperature in winter. The mean monthly temperature (max & min) of Peshawar climatic station has been acquired from Pakistan Meteorological Department (PMD) for the 1981 to 2010 years and presented in **Table 4.2**.

Average monthly mean maximum and mean minimum temperatures of above mentioned station has been discussed in this section which represents the temperature conditions. It may be seen from the **Figure 4.4** below that the temperature rises rapidly until June and the temperature drops with advent of monsoon in July. From June the temperature starts decreasing and the minimum average temperature is recorded in January. The months of December and January are recorded to have lowest temperature.

Table 4.2: Maximum and Minimum Average Temperature of Peshawar

Sr. No.	Months	Mean Max. Temperature (°C)	Mean Min. Temperature (°C)	Mean Temperature (°C)
1.	Jan	18.6	4.4	11.5
2.	Feb	20.1	7.0	13.6
3.	Mar	24.4	11.8	17.8
4.	Apr	30.6	16.8	23.7
5.	May	36.7	22.0	29.4
6.	Jun	40.1	25.5	32.8
7.	Jul	37.7	26.6	32.2
8.	Aug	35.9	25.9	30.9
9.	Sep	35.1	23.0	29.0

⁷ ADB (2017): UCCRTF TA-8913 PAK: Mainstreaming Climate Risk Management into Urban Infrastructure Investments through Urban Resilience Assessments (URAs), Peshawar City, Khyber Pakhtunkhwa, Pakistan.

Sr. No.	Months	Mean Max. Temperature (°C)	Mean Min. Temperature (°C)	Mean Temperature (°C)
10.	Oct	31.2	16.3	23.8
11.	Nov	25.7	9.9	17.8
12.	Dec	20.5	5.3	13.0

Source: Pakistan Meteorological Department

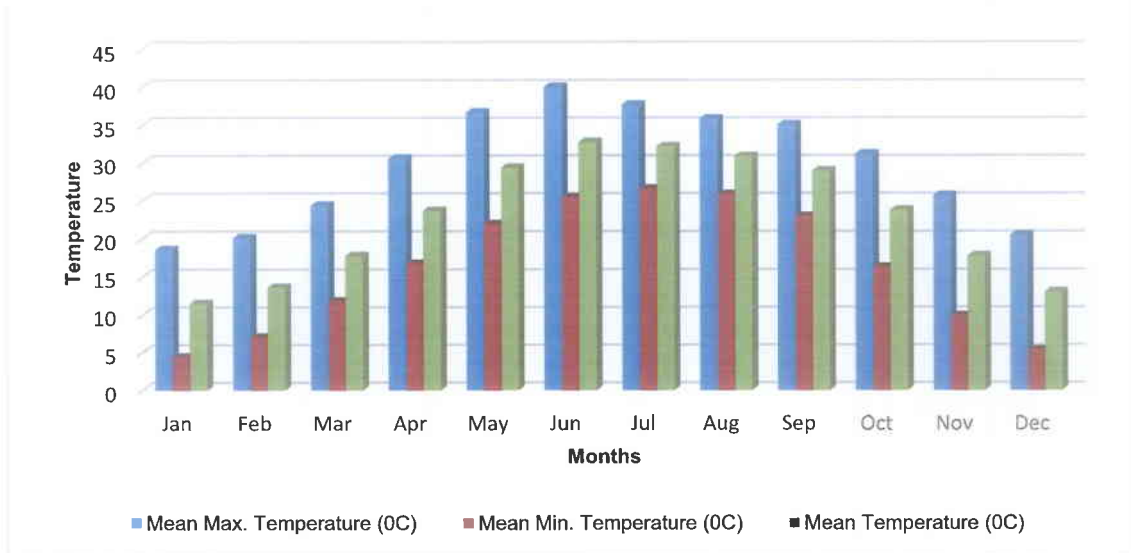


Figure 4.4: Mean Monthly Temperature at Peshawar Meteorological Gauging Station

According to the Metrological Gauging Station of Peshawar, the coldest month is January in which the mean minimum temperature is 4.4°C and the mean maximum temperature is 18.6°C. June is the hottest month with the mean minimum temperature of 25.5°C and the mean maximum temperature as 40.1°C.

4.3.6 Rainfall

Mean monthly rainfall data and the number of rainy days recorded at Peshawar climatic stations in the vicinity of the Project Area are given in **Table 4.3**. The average annual rainfall of the project area is 507 mm and the annual average rainy days are 70.

The maximum rainfall occurs during the month of March and August, which is about 50% of the annual rainfall. Winter rains generally occur during the months of January to April, whereas, November is normally the months with least precipitation.

Table 4.3: Mean Monthly Rainfall of Peshawar

Sr. No.	Months	Mean Monthly Rainfall (mm)	Rainy Days
1.	Jan	40.9	4.4
2.	Feb	60.1	6.7
3.	Mar	80.7	10.8
4.	Apr	62.1	9.1
5.	May	22.6	7.3

Sr. No.	Months	Mean Monthly Rainfall (mm)	Rainy Days
6.	Jun	20.4	3.7
7.	Jul	58.3	6.1
8.	Aug	77.1	7.8
9.	Sep	29.4	4.6
10.	Oct	22.1	3.6
11.	Nov	13.8	2.6
12.	Dec	19.9	3.8
Annual		507.9	70.4

Source: Pakistan Meteorological Department

Graphical representations of month-wise precipitation of Peshawar meteorological gauging station are provided below in **Figure 4.5**.

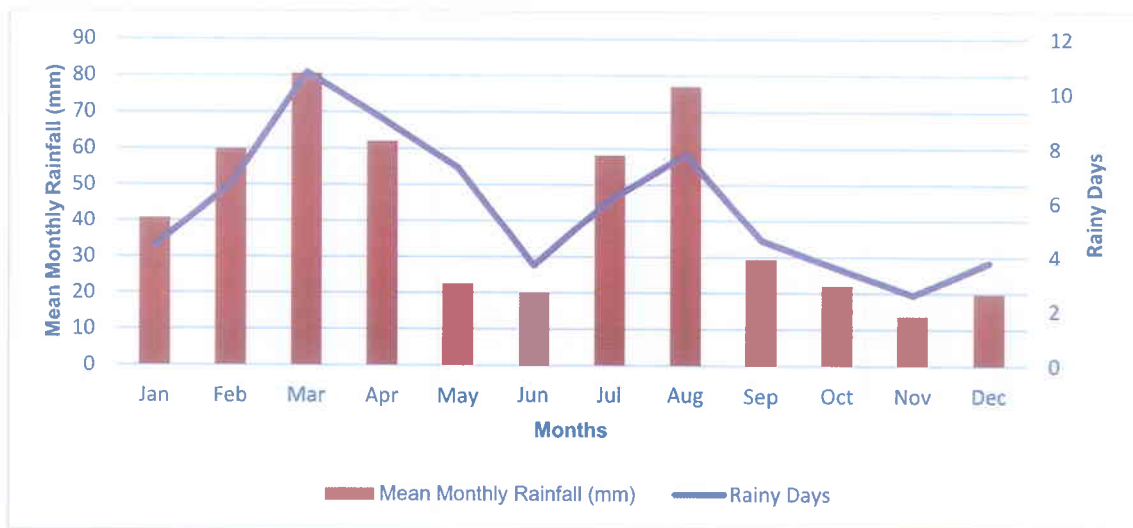


Figure 4.5: No of Rainy Days & Mean Monthly Rainfall of Peshawar

4.3.7 Relative Humidity

The relative humidity data at of proposed Project area of Peshawar is given in **Table 4.4**. The data reveals that at 00:00 hours, the relative humidity levels are generally higher while lower relative humidity levels are recorded at 12:00 hours. Relative humidity levels are mostly high during the month of August, whereas, these are extremely lower during the highest temperature i.e. May and June.

Table 4.4: Relative Humidity Recorded at Peshawar Meteorological Gauging Station

Sr. No.	Months	Relative Humidity (%)		
		00 UTC	03 UTC	12 UTC
1.	January	80.2	78.8	49.1
2.	February	78.1	76.0	42.1
3.	March	79.4	75.1	43.9
4.	April	74.0	66.8	38.7
5.	May	60.9	51.3	29.8
6.	June	60.0	51.0	30.4
7.	July	73.4	67.9	47.8



Sr. No.	Months	Relative Humidity (%)		
		00 UTC	03 UTC	12 UTC
8.	August	80.8	77.2	56.0
9.	September	79.3	75.2	49.6
10.	October	78.2	73.6	46.6
11.	November	78.6	76.5	53.3
12.	December	80.6	79.1	55.3

Source: Pakistan Meteorological Department

Graphical representations of month-wise Relative Humidity of Peshawar meteorological gauging stations are provided below in **Figure 4.6**.

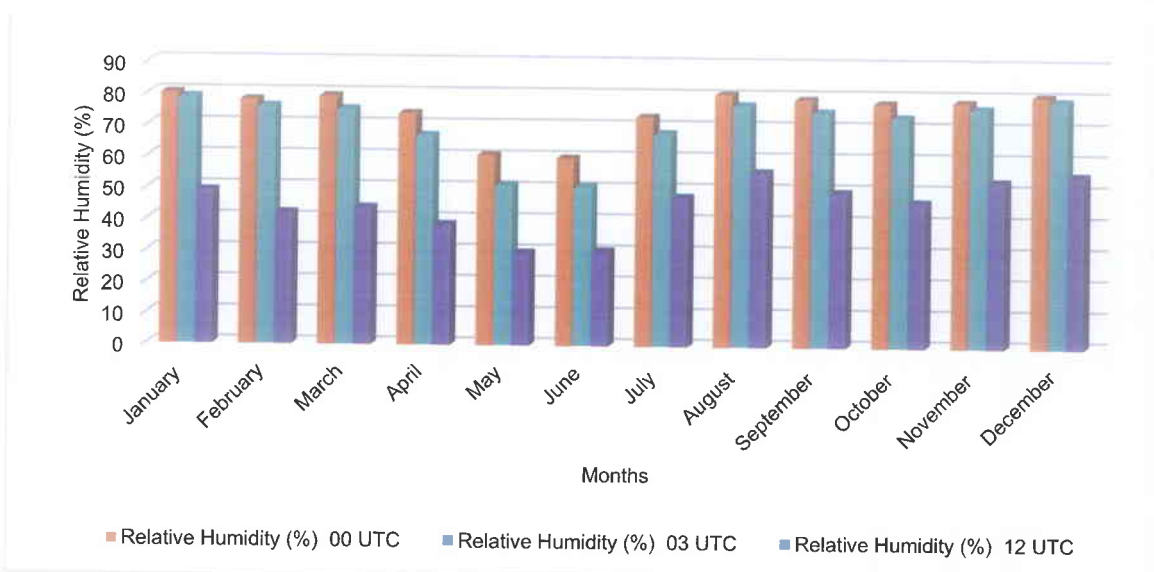


Figure 4.6: Relative Humidity of Peshawar Meteorological Gauging Station

The maximum humidity recorded at weather station is in the month of August i.e. 80.8 % and the minimum humidity recorded is in the month of June i.e. 60.0 % at 00 UTC.

4.3.8 Wind Speed

The mean monthly wind speed at Peshawar weather station around proposed Project Area is given in **Table 4.5**. The data reveals that at 00 UTC, the wind speeds are generally lower while higher wind speeds are recorded at 12 UTC. During summers wind speeds are generally higher than wind speeds in winters.

Table 4.5: Wind Speed Recorded at Peshawar Station

Sr. No.	Months	Wind Speed (knots)		
		00 UTC	03 UTC	12 UTC
1.	January	1.2	1.6	2.2
2.	February	1.5	2.0	4.6
3.	March	1.9	2.1	5.1
4.	April	2.1	2.1	6.4
5.	May	2.4	2.8	7.8
6.	June	2.8	3.4	8.5
7.	July	3.7	4.2	8.2
8.	August	3.1	3.6	7.4
9.	September	2.0	2.6	6.2

Sr. No.	Months	Wind Speed (knots)		
		00 UTC	03 UTC	12 UTC
10.	October	1.1	1.3	3.2
11.	November	1.1	1.3	1.3
12.	December	1.1	1.5	1.3

Source: Pakistan Meteorological Department

Graphical representations of month-wise wind speed Peshawar meteorological gauging station is provided below in **Figure 4.7**.

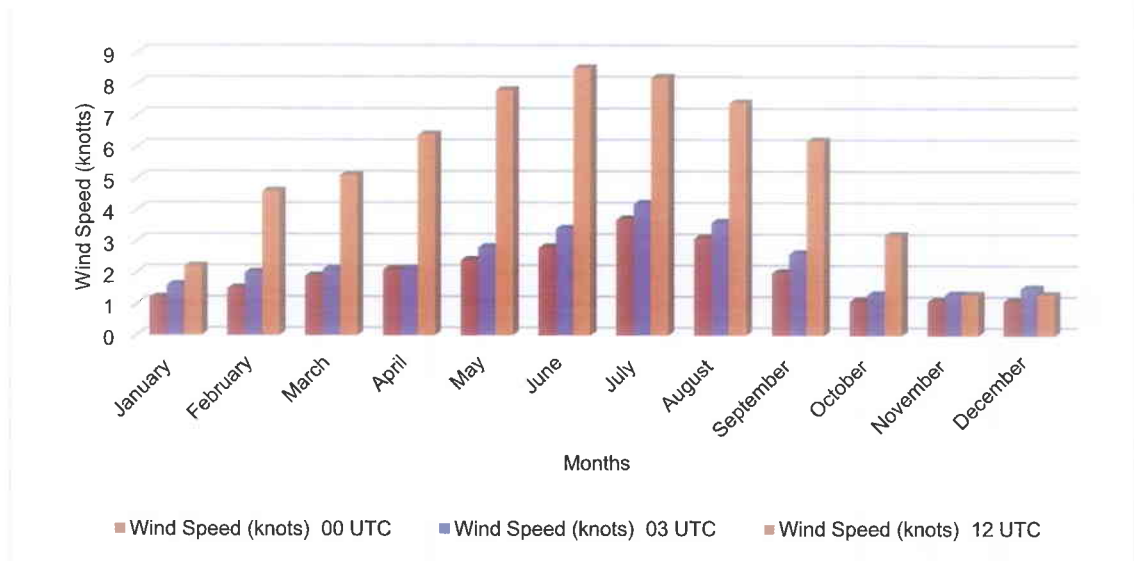


Figure 4.7: Wind Speed of Peshawar Meteorological Gauging Station

The maximum wind speed recorded at Peshawar weather station is 8.5 knots in the month of June and the minimum wind speed is 1.3 knots in the month of December at 12 UTC.

4.3.9 Surface water

There are four important rivers flowing in Peshawar region. Kabul River is the biggest river, which enters Peshawar near Warsak in the west, and discharges into Indus River, 4km downstream of Jehangira. It divides Peshawar into the northern and southern part. Swat River enters Peshawar in the northwest near village Manda Qila and falls into Kabul River near Charsadda. Bara River flows from the south and enters Peshawar near Jhansi Post. It supplies Peshawar with drinking and irrigation water and discharges into Kabul River. It also drains large area of northern part of Peshawar and finally discharges in the Kabul River 5 km downstream of Nowshera.

There is heavy dependence on the Kabul, Bara and Swat rivers to obtain water for everyday use for the residents of Peshawar.



Agriculture is largely dependent on Canals. Moreover, tube wells irrigation is also available in some places. 73% of the rural mouzas are irrigated by canals while 15-20 % are irrigated by other sources including river, Tube-wells, ravine, and spring stream etc.⁸

Kabul River is situated 142 meters in the east of RD (0+000) of the proposed Project and it flows across throughout the project road. The surface hydrological map of the proposed Project area is shown in **Figure 4.8**.

⁸ ADB (2017): UCCRTF TA-8913 PAK: Mainstreaming Climate Risk Management into Urban Infrastructure Investments through Urban Resilience Assessments (URAs), Peshawar City, Khyber Pakhtunkhwa, Pakistan.

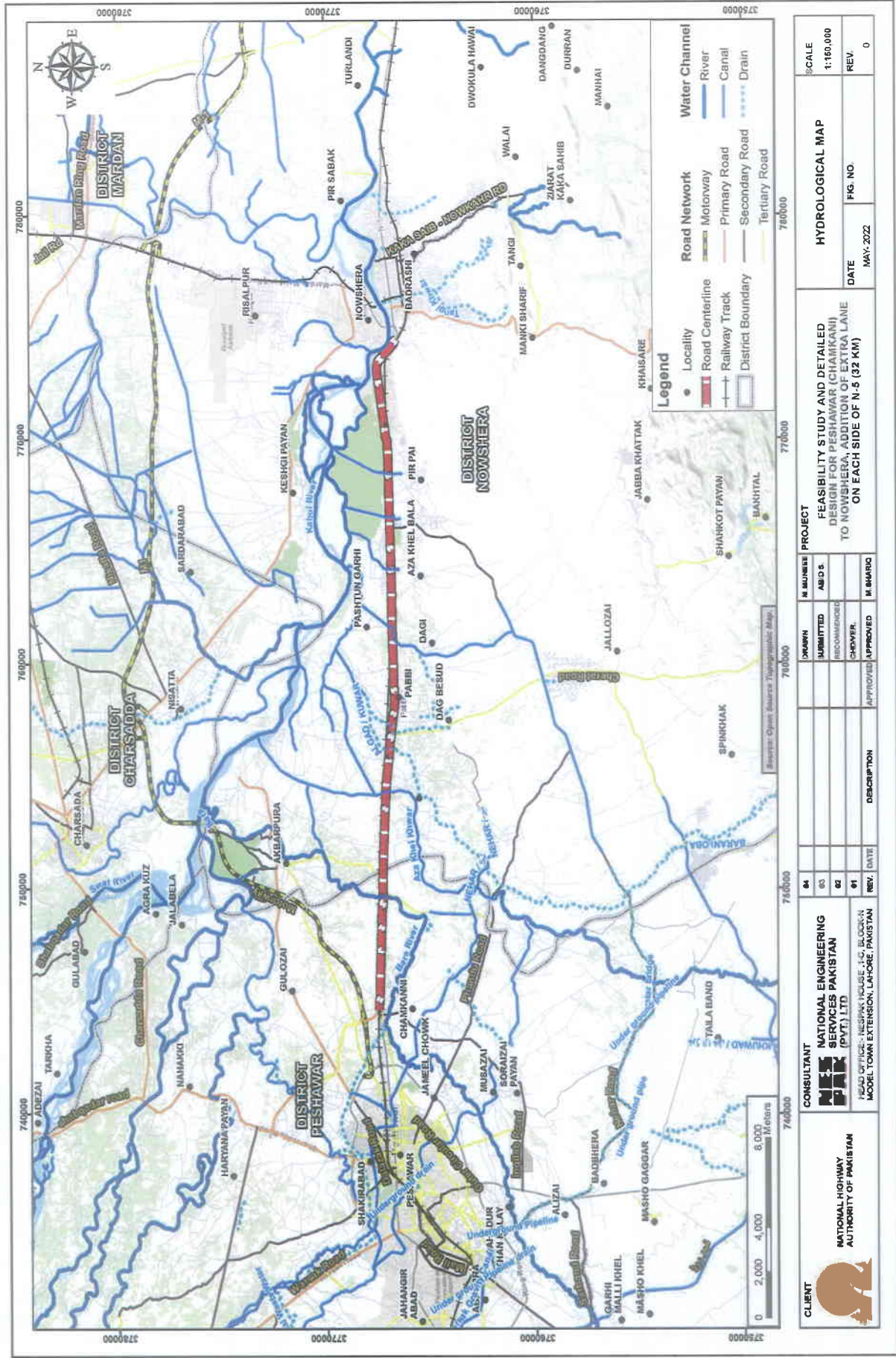


Figure 4.8: Surface Hydrological Map.



4.3.10 Groundwater

Due to the presence of Kabul River near the Project area, groundwater is available at 30-40 feet but the drinkable water is extracted at 150 feet depth which has also been contaminated since the 2010 major Flood.

4.3.11 Solid Waste and Wastewater Situation

In District Peshawar and Nowshera, there are open water channels for storm water and sewerage. The wastewater from commercial and residential areas discharge into these open drains which subsequently merge into Kabul River. The solid waste of these areas are managed by their respective Municipal Corporations which dispose it into the open dumping area.

4.3.12 Environmental Monitoring, Sampling and Testing for Proposed Project

In order to determine the ambient air, background noise levels, water and surface water /wastewater quality of the study area different locations were selected in or near the RoW. The sampling locations for the environmental monitoring of ambient air, noise and water for proposed Project is shown in **Figure 4.9**. Detailed environmental motoring, sampling and testing report is attached as **Annex-I**.

Three (03) surface water/ wastewater and three (03) drinking water/groundwater samples were collected. Similarly, three (03) points were selected for ambient air and background noise monitoring at site. The work for external monitoring and testing was awarded to an EPA approved environmental laboratory i.e. M/S Green Crescent Environmental Consultants (Pvt) Ltd. The details of monitoring points are provided in **Table 4.6** below:

Table 4.6: Environmental Monitoring, Sampling and Testing Points

Sr. No.	Surface Water / Wastewater	Drinking Water / Ground Water	Ambient Air & Noise	Remarks
1.	SW/WW1 Near Attock Pump, Amangarh	---	---	All parameters are within Prescribed Limits of FAO except Chloride.
2.	---	---	A&N -1 Near Makkan Medical Center	All parameters of ambient air and noise levels are within prescribed limits of NEQS.
3.	---	---	A&N-2 Near Nasirpur Railway Station	All parameters of ambient air and noise levels are within prescribed limits of NEQS.
4.	---	DW/GW-1 Attock Pump Amangarh Village	---	All parameters are Within Prescribed Limits of NEQS.
5.	---	---	A&N -3 Near Askari Pump	All parameters of ambient air and noise levels are within prescribed limits of NEQS.
6.	---	DW/GW-2	---	All parameters are Within Prescribed Limits of NEQS.



Sr. No.	Surface Water / Wastewater	Drinking Water / Ground Water	Ambient Air & Noise	Remarks
		Maqbool Property Dealer, Pabbi		
7.	SW/WW-2 Drain Near HP3 Mosque	---	---	All parameters are Within Prescribed Limits of NEQS
8.	SW/WW-3 Canal Tarnab, Peshawar	---	---	All parameters are Within Prescribed Limits of NEQS
9.	---	DW/GW-3 Taru jabba Kabab Center, Taru Jubba	---	All parameters are Within Prescribed Limits of NEQS
Total	3	3	3	

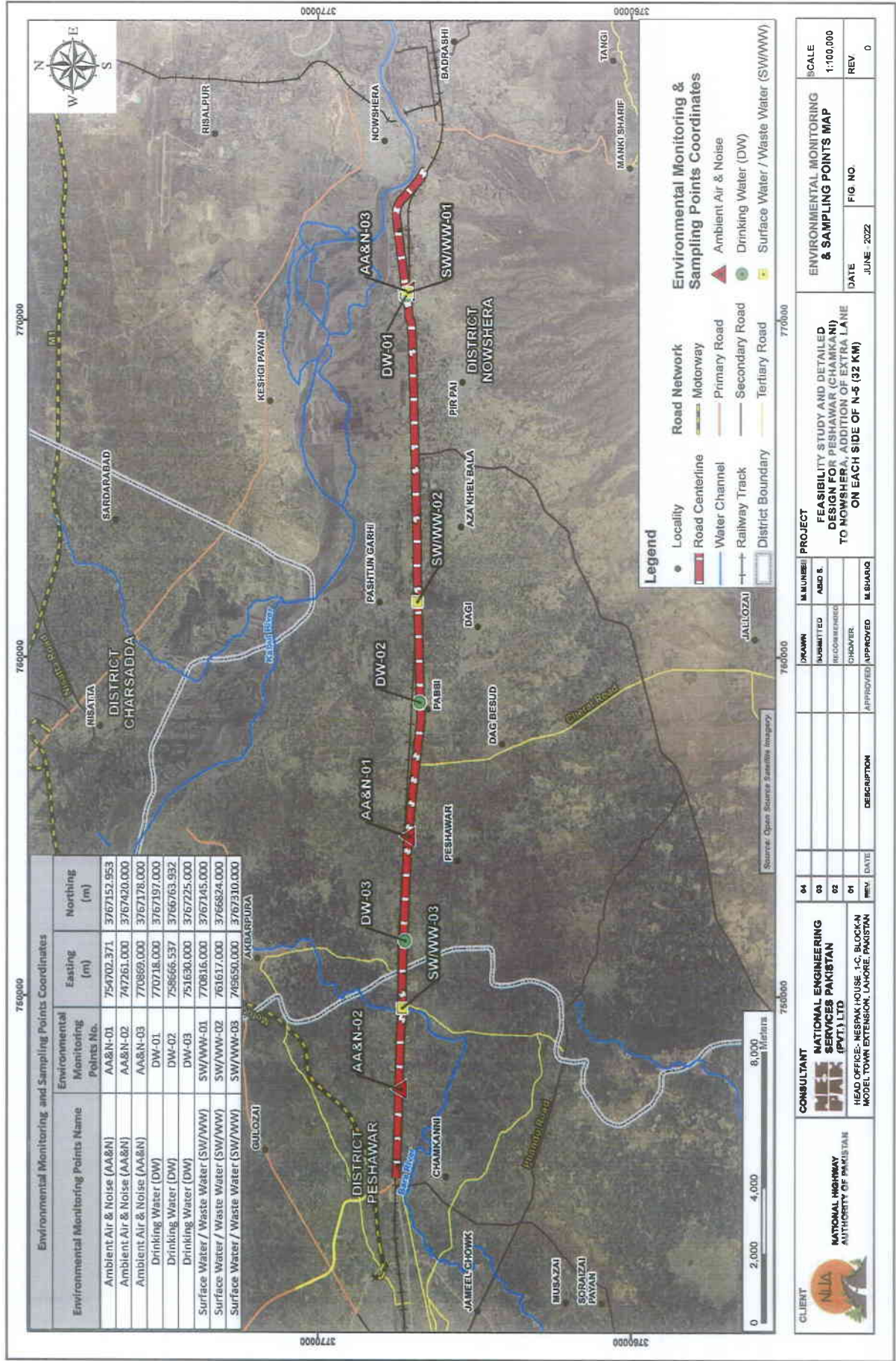


Figure 4.9: Environmental Monitoring & Sampling Points Location Map



4.3.13 Land use of the Proposed Project

There are different types of landuse i.e. barren / open, built-up, cultivated land, graveyards, railway track, road/track, stream/ nullah, residential and commercial details structures, trees/ bushes and orchards etc. Shops have also been observed along the entire alignment of the project area.

Landuse of the proposed Project is based on the GIS. Index Land use map of the Col is shown in **Figure 4.10** and details are given in **Table 4.7**, whereas detailed maps are provided as **Annex-II**.

Table 4.7: Summary of Landuse in the Col

Sr. No.	Landuse Type	Area (Acres) in COI
1	Barren / Open Area	365.94
2	Builtup Area	134.78
3	Cultivated Land	17.72
4	Graveyard	2.15
5	Orchard	1.83
7	Railway	1.15
8	Road / Track	227.34
9	Stream / Nullah	4.29
10	Trees / Bushes	28.42
Total Area		783.67

4.3.14 Environmental Sensitive Receptor of the Proposed Project

Sensitive receptors are people/places more susceptible to the adverse effects of exposure to the pollutants and social disturbance, due to the developmental projects. Thus, sensitive receptors are necessary to be identified, to evaluate the potential impacts of the proposed Project on public health and the environment and adopt necessary mitigation measures to minimize the impact.

The sensitive receptors identified for the proposed Project within or near the Col are mosques, hospitals, schools, colleges and graveyards. They are prone to sensitivity during construction phase, due to emission of air pollutants, noise and vibration, traffic jams/access, temporary edifice of construction camps, and mobilization issues.

The map of sensitive receptors of the study area is shown in **Figure 4.11**, whereas stretch wise maps are provided in **Annex-III**

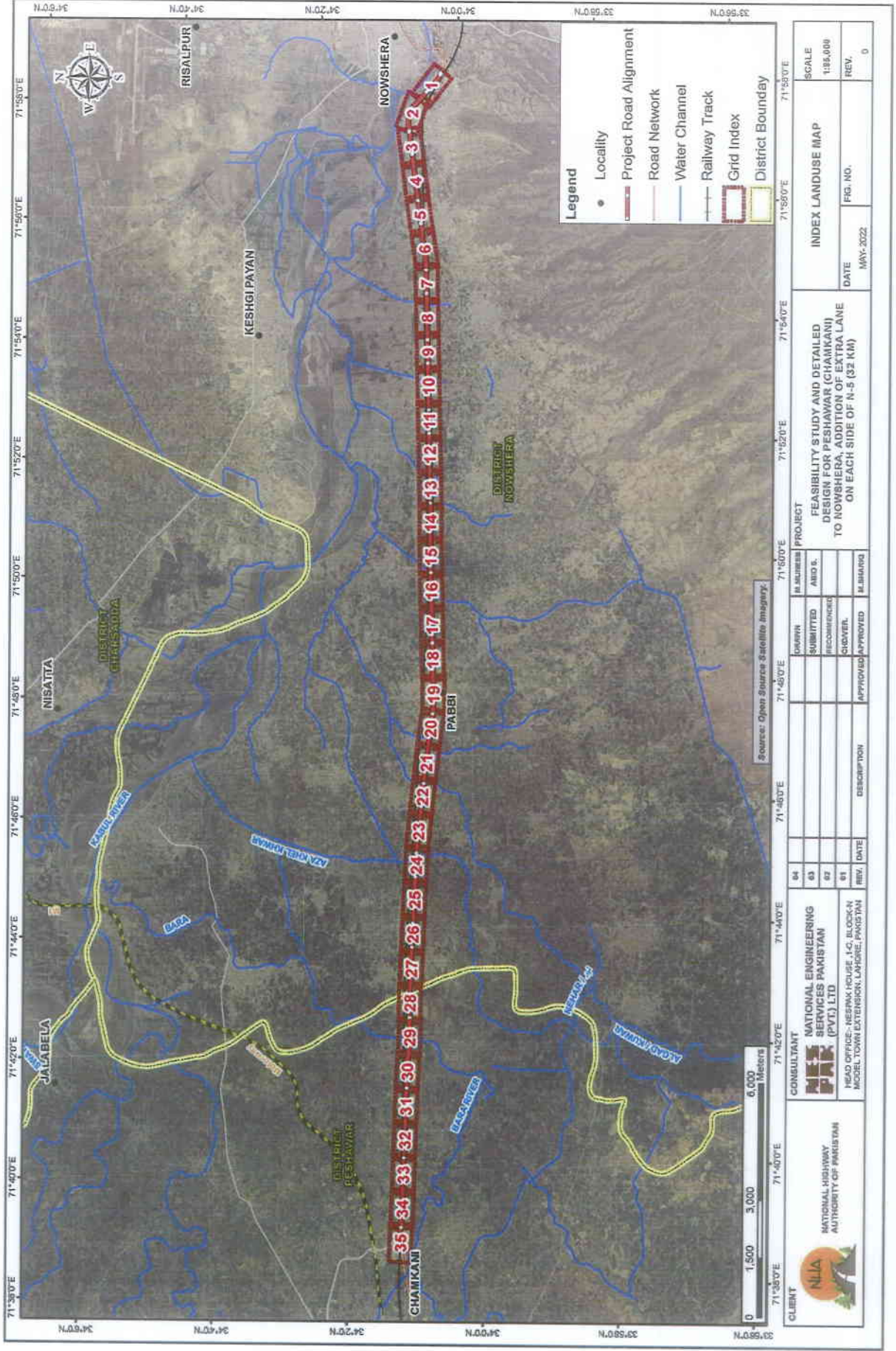


Figure 4-10: Index Land use Map

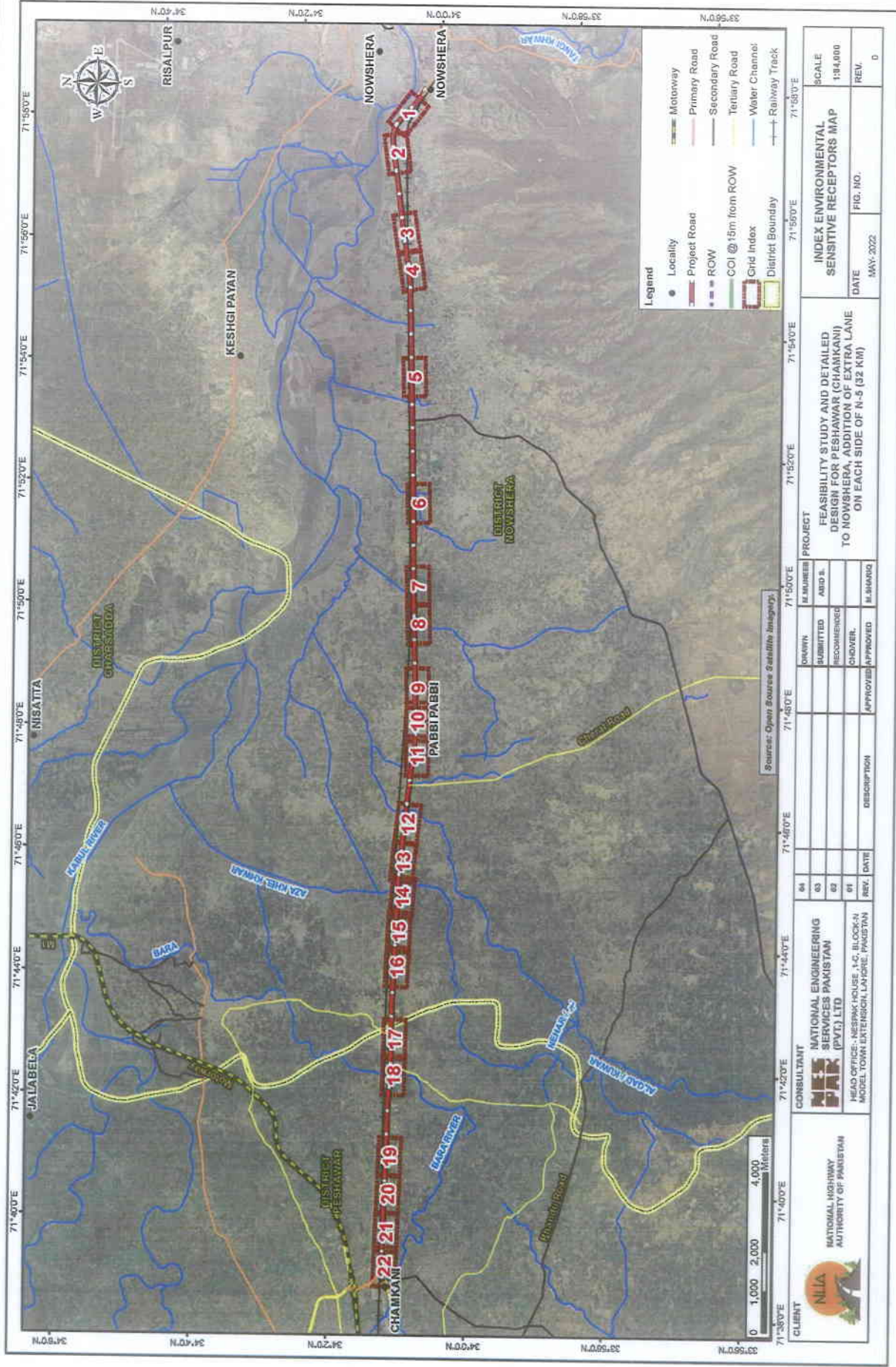


Figure 4.11: Index Environmental Sensitive Receptors Map::



4.4 ECOLOGICAL ENVIRONMENT

4.4.1 Methodology

All the available literature was thoroughly reviewed to have a better understanding of the project area and its surroundings including habitat, flora and fauna. The project area was thoroughly examined based on the primary and secondary (Flora of Pakistan-MI-Sheikh, Birds of Pakistan-ZB-Mirza-Mammals of Pakistan-TJ Roberts, Manual of silviculture for Pakistan [1965] Champion, Sir H.G.; Pakistan Forest Inst., Peshawar eng; Seth, S.K. Khattak, G.M.) data. This survey broadly covers ecosystem sensitivities (If any), vegetation, other flora and fauna. Numbers of trees along RoW/Col and in the project vicinity was recorded which includes, majorly pole crops.

The Study Area is situated in semi-arid region of Pakistan. The region is characterized by dry climate both in summer and winter season. The water precipitation is in the form of occasional seasonal rains, during rainy season (July– September).

Forest found in the region is Tropical thorn forests. These are low, open and pronouncedly xerophytic forests in which thorny leguminous species predominate. This type occupies the whole of the Indus plain except the driest parts. The major tree species are *Prosopis cineraria* (Jhand), *Capparis decidua* (Karir, Karil), *Zizyphus mauritiana* (Ber), *Tamarix aphylla* (Farash) and *Kikar* (*Acacia nilotica*)

On the basis of climax vegetation, the whole Indus basin plain with the exception of parts of the districts of Sialkot, Gujrat and Jehlum, consists of tropical thorn forests. Prior to development of irrigation, agriculture and urbanization, the area extended from the foothills of the Himalayas and low-hills in the south-west Punjab plains and Balochistan to the Arabian Sea.

Earlier, these forests merged with Riverain forests along the river banks and with scrub forests in the low hills in the north and north-western regions of Pakistan. Together these forests provided an ideal habitat to the wildlife of the area which seasonally migrated according to their needs; during cold winter from the lower hills towards the plains in search of food and shelter, from the flood plains towards the dry areas during floods and towards the rivers during the summer drought. This is no longer the situation.

The road side trees are owned and managed by Forest department KP, prior to start the construction NOC from forest department is mandatory as per Law of land, as these trees are declared under protected forest.

4.4.2 Ecosystem and Floristic Composition of the Study Area

Vegetation of the area shows that it is suitable for plantation of native species along the agriculture fields and road side. Variation in diversity is caused due to climate, heterogeneity, biotic interaction and habitat. In the past, the area was covered with huge amount of ground



vegetation and dominated by trees but now the conditions are at the adverse side because the original or natural habitat has been modified and converted into barren land for construction and for agricultural purposes. This particular area has been accessible to humans for a long time resulting in low diversity and wildlife abundance. The area may be considered as degraded or modified habitat due to continuous urbanization and other climatic and anthropogenic threats in the region.

4.4.3 Natural Vegetation

Natural vegetation including Karir (*Capparis aphylla*), Aak (*Calotropis procera*), Kana (*Saccharum bengalensis*), Khabbal (*Cynodon dactylon*), Lamb (*Aristida depressa*), Gorkha (*Lasiurus indicus*) is present only in the graveyards or at open areas along the existing roads and canals. Mesquit (*Prosopis glandulosa*) has invaded many open areas. Koondar (*Typha angustata*) grows along water ponds and wet places.

The project area is populated mostly by Eucalyptus (*Eucalyptus camaldulensis*) along with some other species including Mulberry (*Morus alba*), Shisham (*Dalbergia sisso*), Ber (*Zizyphus mauritiana*), Kikar (*Acacia nilotica*) etc.

Table 4.8 shows tree species found in the project and study area

Table 4.8: List of Flora Found in the Project & study area Area

Sr. No	Common/English Name	Botanical Name
1	Shisham	<i>Dalbergia sisso</i>
2	Sumbal	<i>Bombax ceiba</i>
3	Mulberry	<i>Morus alba</i>
4	Dharek	<i>Melia azedarach</i>
5	Kikar	<i>Acacia nilotica</i>
6	Ber	<i>Zizyphus mauritiana</i>
7	Bottle brush	<i>Callistemon rigidus</i>
8	Sufaيدا/Lachi	<i>Eucalyptus camaldulensis</i>

4.4.4 Shrubs and Herbs

Shrubs and herbs which are commonly found in the study area are Jawan (*Alhajim aurorum*), Bhakra (*Tribulus terrestris*), AK (*Calotropis procera*) Lana (*Sueda fruticosa*), Phogs (*Calligonum polygonides*) Jantar (*Sesbania aculeata*) and Tumba (*Citrullusco locyntbus*). Jantar, Tumba and Bathu are found mostly grown in left over agricultural fields, while Arind is present mostly along the water channels. The remaining shrubs and herbs grow in open places.

4.4.5 Fauna

The tract is rich in natural fauna and especially the avi-fauna is well diversified and colourful. Fauna and flora are an essential part of the environments and depend on each other in many ways and as the flora is not only plentiful, but also enriched with lush green crops. The fauna of the area comprises mammals, reptiles and birds etc.

4.4.6 Mammals

Mammals of the track dominant by jackal, porcupine, squirrel and mongoose. The details are given in **Table 4.9**

Table 4.9: Faunal Species in the Study Area

Sr. No.	Common Name	Scientific Name
1	Jackal	<i>Canis aureus</i>
2	Porcupine	<i>Hystrix indica</i>
3	Squirrel	<i>Funambulus pennant</i>
4	Mouse	<i>Funambulus pennant</i>
5	Mongoose	<i>Herpestes auropunctatus</i>
6	Indian mole rat	<i>Rattus rattus</i>

4.4.7 Reptiles

Amphibians and reptiles collectively called Herps, are very important animals among the vertebrates and important components of any living system. They may act as excellent biological indicators of any ecosystem. Their position in the ecological niche is so vulnerable that the survival and collapse of the whole energy cycle depends upon the presence and absence of the amphibians and reptiles. Reptiles reported in the Study Area are enlisted in below **Table 4.10**.

Table 4.10: Reptiles in the Study Area

Sr. No.	Common Name	Scientific Name
1.	Brown Cobra	<i>Naja oxiana</i>
2.	Indian Krait	<i>Bungarus caeruleus</i>
3.	Spiny tailed Lizard	<i>Uromastyx hardwickii</i>
4.	Fringed toed Lizard	<i>Acanthodactylus cantoris</i>

4.4.8 Amphibians

Amphibians are represented in Pakistan by anurans i.e. frogs and toads and total 24 species of amphibians are reported in Pakistan. Amphibians found in the Study Area are given in **Table 4.11**.

Table 4.11: Amphibian Species in the Study Area

Sr. No.	Common Name	Scientific Name
1.	Common Frog	<i>Rana tigrine</i>
2.	Common Toad	<i>Bufo bufo</i>

4.4.9 Avifauna

The original Species of area are no more found due to human activities. A fairly not diverse range of bird species is found living in some of suitable areas of the proposed site, including common species such as the dove, common myna, tree pie, crow, and sparrow. Rarely seen birds of prey include the common pariah kite is rare. As a level of threats/disturbance along the project area are high but the occurrence or observation of occurrence of birds in the treatment site or project is low.

Birds of the track consist of small and medium sized in insignificant number due to non-availability of suitable habitat includes Food & shelter. Birds of the project site are listed in Table 4.12.

Table 4.12: Avifauna in the Study Area

Sr. No	Common Name	Scientific Name
1	Koel	<i>Eudynamys scolopaceus</i>
2	Tree Pie	<i>Dendrocitta vagabunda</i>
3	Crow	<i>Corvus corax</i>
4	Rock Dove	<i>Columba livia</i>
5	Spotted doves	<i>Spilopelia chinensis</i>
6	Grey Geese	<i>Anser anser</i>
7	Myna	<i>Acrida thestritis</i>
8	House Sparrow	<i>Passer domesticus</i>
9	House Crow	<i>Corvus splendens</i>
10	Asian Koel	<i>Eudynamys scolopacea</i>
11	Rose ringed parakeet	<i>Psittacula krameri</i>
12	Golden orioles	<i>Oriolus oriolus</i>
13	Blue rock pigeon	<i>Columba livia</i>
14	Ducks	<i>Anas platyrhynchos</i>

4.4.10 Endangered Fauna

There are no endangered species of fauna in the tract.

4.4.11 Wetlands

There are no wetlands in the Project Area.



4.4.12 Game Reserves/ Wildlife Sanctuaries/ National Parks

There is no game reserve, wild sanctuaries and National Park present in and around the Project Area.

4.5 SOCIAL ENVIRONMENT

The socio-economic aspects were studied with respect to human and economic development and quality of life values of the population in the Project Area. The human and economic development mainly focuses on population and communities, industrial development, infrastructure availability, institutions, transportation network, prevailing land use, power sources and agricultural pattern. Quality of life includes socio-cultural values, public health situation, recreational resources & development and archaeological/historical and cultural sites etc. Baseline information was gathered from literature, study reports, districts census reports and through field surveys comprising interviews and meetings by the Consultants' social team, using survey tools. During the field survey interviews and meetings with the different categories of respondents were conducted and observations were also recorded after giving due consideration during survey.

4.5.1 Administrative Setup of District Peshawar

Peshawar district is divided into four towns. Each town in turn consists of a number of union councils. There are a total of 92 union councils in district Peshawar.

There is only one tehsil in the district i.e. Peshawar tehsil. District administration is headed by the Deputy Commissioner (DC), who is assisted by district heads of departments. The main district departments include: administration, police, education, health, communication and works, agriculture, forest, irrigation, telecommunication and livestock. The head of each district department is responsible for the performance of his department and is generally designated as the Deputy Director or District Officer.

a) Demography and Population

The population of Peshawar district in 1998 was 2,026,851. The city's annual growth rate is estimated at 3.99% per year, and the population of Peshawar district is 4,269,079 according to the 2017 census, Peshawar is the sixth-largest city of Pakistan. Most of the families are living in joint family system. Due to joint family system, the family size is large i.e. 8.6.

b) Religion

Over 99% of the city's population is Muslim. Despite overwhelmingly Islamic nature of modern Peshawar, it was previously home to other smaller communities such as Afghan Jews, Zoroastrian, Hindus and Sikhs. Its famous markets such as the Qissa Khawani Bazaar (market of story tellers) are emblematic of this mixture of culture and offer a variety of goods including gold and silver ornaments, traditional carpets, pottery, and clothing to artwork in wood, brass

and precious stones. Even today, Peshawar is the commercial, economic, political and cultural capital of the Pashtuns as well as a major center of Hindko culture in Pakistan.

c) Cultural and Archaeological sites

Peshawar is one of the most ancient cities of this region and for centuries has been a center of trade between Afghanistan, South Asia, and Central Asia as well as the Middle East. It is a conservative Islamic city with a rich history. Peshawar's inhabitants consist mainly of Pashtun and Hindkowans. In addition, many Punjabis, Chitralis, Tajiks, Uzbeks and Hazaras can be found in the city.

d) Languages

Though Pashto followed by Hindko is the main language spoken in the district, other languages such as Urdu, Persian, Saraiki and Punjabi are also spoken by some of the residents of the district.

e) Transport

BRT Peshawar is a modern & 3rd generation rapid bus service of Peshawar, which has started its service on 13 August 2020. It has 32 stations and 220 buses, which covers area from Chamkani to Karkhano Market. BRT Peshawar has replaced Peshawar's old, chaotic, dilapidated, and inadequate transportation system. The system has 32 stations and is mostly at grade, with four kilometres of elevated sections. The system also contains 3.5 kilometres of underpasses. BRT Peshawar is also complemented by a feeder system, with an additional 100 stations along those feeder lines.

Peshawar is well-served by private buses (locally referred to as "flying coaches") and vans that offer frequent connections to throughout Khyber Pakhtunkhwa, as well as all major cities of Pakistan. The city's Daewoo Express bus terminal is located along the G.T. Road adjacent to the departure points for several other transportation companies.

f) Industry

Peshawar district is comparatively developed area in the province of Khyber Pakhtunkhwa. Khazana sugar mill and a number of small industrial units in the industrial estates located at Kohat road and Jamrud road are functioning, which are manufacturing hosiery, small arms, leather and foot wear, garments, ghee, soap, etc. Match factories, flour mills and steel re-rolling units are also operating in the district.

There are a total of 550 Industrial Units in district Peshawar that provide employment to 14,471 people and the total Investment of all these industries amounts to Rs. 5009.902 million.



g) Health Care

Presently, in district Peshawar, health services are provided by both Public and private institutions. There are 12 public hospitals - out of these, 3 are teaching hospitals, 72 private hospitals, 3 Rural Health Center (RHC), 37 civil dispensaries, 4 Maternal and Child Health (MCH) centers, 49 Basic Health Units (BHUs) and 4 Tuberculosis (TB) clinics in district Peshawar. The total beds strength of government teaching hospital is about 3460 beds. Also, there are 1,046 doctors, 176 dispensers, 708 nurses, 60 Lady Health Workers (LHW) and 1,888 other paramedical staff posted by the government in the district.

h) Literacy Rate

The literacy rate for population 10 years and above (2010-2011) was 54 percent (Males: 68%, Females: 32%) which increased to 59% in 2013. For the urban rural comparison, the urban literacy rate is higher than the rural, which is 62 percent. Among urban community, literacy ratio for male is 75 and for female it is 47; whereas the rural literacy ratio is 45 percent, and in rural community, literacy ratio for male is 61 and for female it is 29. Adult literacy rate (> 15 years) is 51 percent. Gross Enrollment Rate (GER), at the primary level, is 93% (Male: 101%, Female: 85%). Net Enrollment Rate (NER), at the primary level, is 56% (Male: 59%, Female: 52%).

4.5.2 Administrative Setup of District Nowshera

Nowshera was a tehsil (sub division) of Peshawar until 1988, when it became a district. It is bordered by Peshawar District to the West, Mardan District to the North, Charsadda District to the North West, Swabi District to the North East, Kohat District to the South, Orakzai Agency to the South West & Attock District to the East.

Previously it was known as Nowkhaar Province till it was annexed into British India via the Durand Line Agreement. Prior to its establishment as a separate district in 1990, Nowshera was part of Peshawar District. The district was also part of the Peshawar Division until the reforms of The Government of Pakistan. There are three military cantonments situated in Nowshera district, which are Cherat cantonment, Nowshera cantonment and Risalpur cantonment. Therefore, Nowshera is also one of the most prominent districts of Pakistan.

District administration is headed by the Deputy Commissioner (DC), who is assisted by district heads of departments. The main district departments include: administration, police, education, health, communication and works, agriculture, forest, irrigation, telecommunication and livestock. The head of each district department is responsible for the performance of his department and is generally designated as the Deputy Director or District Officer.

Total area of Nowshera is 1,748 km². The population density is 608 persons per square kilometer. The total agricultural area is 52,540 hectares. The main source of income of the region is agriculture.

4.5.2.1 Population Communities and Employment



According to the census report of 1998 the total population of Nowshera District was 874,373 persons with an annual growth rate of 2.9% at that time. Moreover 2017 census says that the total population of Nowshera District is 1,520,995 persons. The district is predominantly (99%) Muslim. The next higher percentage is of Christians with 0.5%, followed by 0.3% Ahmadis and 0.1% Hindu. Other minorities and scheduled castes are small in number. Areas adjacent to the project site are all from Khattak tribe and are almost 100% Muslims.

Pushto is the predominant language being spoken in the district, representing 91% of the population, followed by Punjabi spoken by 3.6%, Urdu 1.3% and Siraiki 0.3%. Others speak Sindhi, Balochi, Baravi and Dari.

The total economically active population 95.6% were registered as employed in 1998. Nearly two- forth (38.9%) were self-employed, 28.4% were private employees and 24.2% government employees. Unpaid family helpers were recorded as 4.4%. The difference in proportions of employed population was significant between the genders in both urban and rural residences. Only 1% of the females are economically active out of which 3.9% of the women are unemployed.

4.5.2.2 Transportation and Tourism

Nowshera District is linked with the rest of the country by rail, air and roads. National Highway (N-5) enters at Khairabad and goes all along in the district. PAF Air Base at Risalpur and Pakistan Railways are worth mentioning. More than half of the motorways in KP pass through Nowshera. There is a network of farm to market roads, within the districts.

a) Energy Sources

Within Nowshera district distribution lines for electrical power run to a 132 kV grid sub-station Nowshera. The existing main 220kV Grid Station is present in Mardan which supply energy to Nowshera.

b) Education and Literacy

The literacy ratio in Nowshera district increased from 23.8% in 1981 to 42.5% in 1998. The literacy ratio for males is 60.6% and for females is 22.7%. Literacy is much higher in urban areas (55.6%) compared with rural areas (37.6%) for male and female.

c) Health Facilities

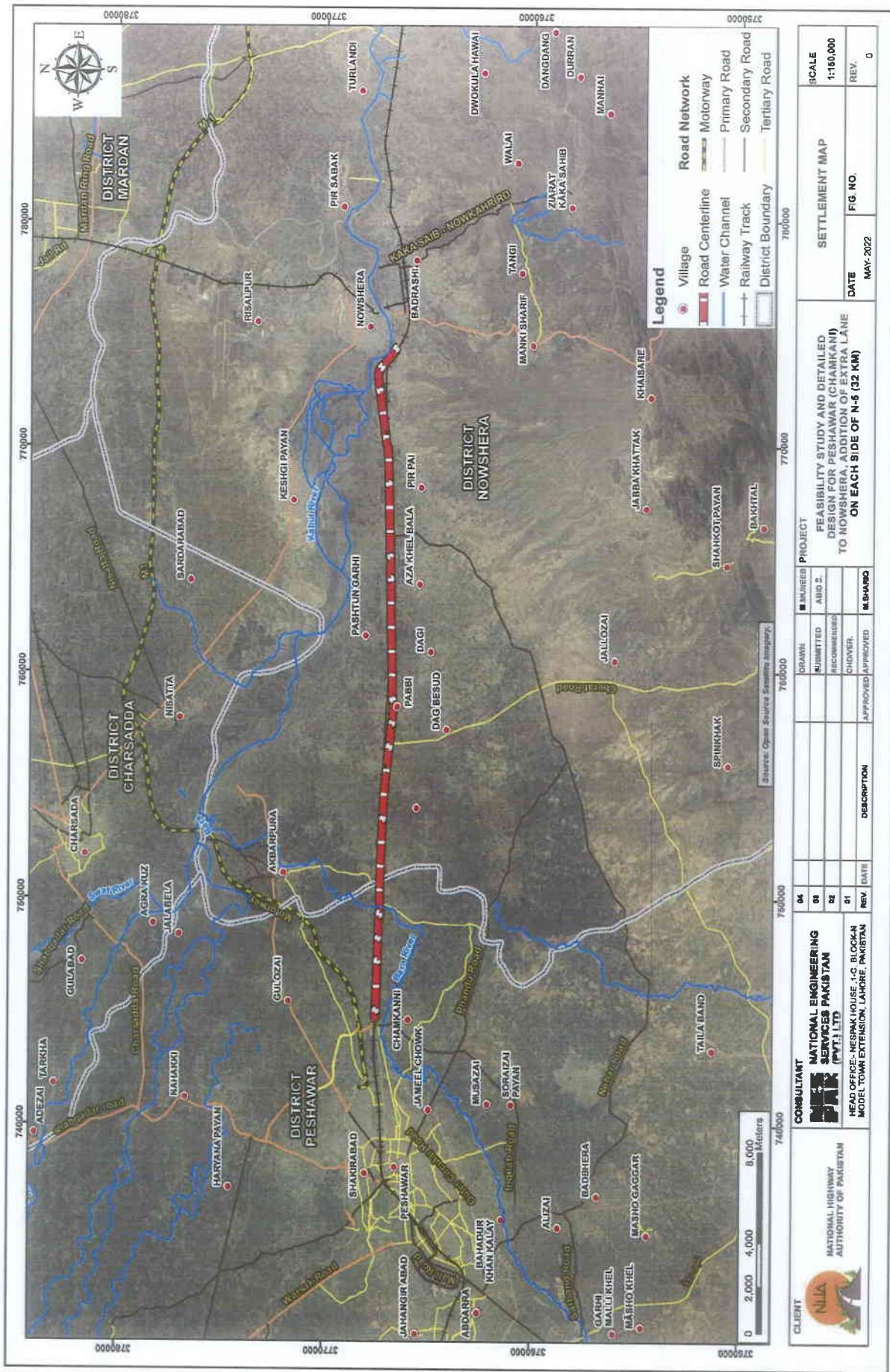
Health facilities in Nowshera City are adequate. District Headquarter Hospital, Combined Military Hospital (CMH) are main hospitals in the city. Other than that there are a number of private doctors and hakeems present in the city.

d) Cultural Heritage and Community Structures



A majority of the people of the district is purely Pashtoon. The major tribe in or near the project vicinity is Khattak. Joint family structure is common in the region. Families live in a big compound with separate rooms for each sub family. The oldest family male is the head of the family and usually takes all the major decisions for his family.

The Settlements present nearby project area are shown in **Figure 4.10**



CLIENT NATIONAL HIGHWAY AUTHORITY OF PAKISTAN		CONSULTANT NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD HEAD OFFICE - NESR HOUSE 1-C BLOCK-N MODEL TOWN EXTENSION, LAHORE, PAKISTAN		PROJECT FEASIBILITY STUDY AND DETAILED DESIGN FOR PESHAWAR (CHAMKANI) TO NOWSHERA, ADDITION OF EXTRA LANE ON EACH SIDE OF N-5 (32 KM)		SETTLEMENT MAP SCALE: 1:150,000 REV: 0	
REVISIONS		APPROVALS		DATE		FIG. NO.	
04		04		01		MAY-2022	
03		03		02			
02		02		03			
01		01		04			
REV.	DATE	DESCRIPTION	APPROVED	APPROVED	DATE		

Figure 4.12: Settlement Map :



4.5.3 Socio Economic Characteristics

a) Objectives of the Socio-economic Baseline Survey

Socio-economic baseline survey presents an overview of the socio-economic conditions of project area in general, focusing on the key socio-economic development indicators such as demography, education and health facilities, income, expenditure trends and employment, to provide the context of the area in general. The main objective of the study was to analyze socioeconomic and cultural characteristics of the project beneficiaries in order to understand their interrelationships, dynamics, and qualities. The study also provides information to the project design in order to make the project interventions more effective, socially acceptable, culturally appropriate, gender sensitive and economically viable. Baseline surveys were carried out during May 17, 2022 to May 20, 2022.

One of the key objectives of the study was to plan more sustainable and equitable development through adequate social risk management by identifying and assessing negative and positive impacts caused by a project, to design and implement measures to prevent, reduce or compensate adverse impacts and enhance positive ones.

b) Information / Data Collection Methodology

The methodology adopted for the survey included a detailed desk review of Project documents and relevant secondary information including official records and statistics, as well as academic and other subject matter reports. The secondary source information/data/reports include Detail Design drawings and latest Population Census Reports (2017) of all two districts. Similarly, primary source includes community consultations, individual interviews and walk through the Project area, which helped the survey team to physically observe the socio-economic conditions in the project area and data collection. Meetings were held with all stakeholders including the local community.

A sample survey of 82 respondents was undertaken for the socio-economic survey from the COI of the proposed Project (refer **Table 4.13**). Participants of Community consultations and Government departments are not the part of representative sample. Sample was taken from the different locations of route of the proposed road passing in the areas on the basis of random sampling technique, which included local residents, shop keepers, drivers, laborers and private employees etc. The objective of using the random sampling technique was to get the data of the respondents of different categories along the alignment of the proposed road and covering the entire area.

Table 4.13: Number of Respondents of Project Area

Sr. No.	Settlements nearby of Project Area.	Number of Respondents
1.	Nasir Pur Phatak	7
2.	Nowshera Bypass	6



Sr. No.	Settlements nearby of Project Area.	Number of Respondents
3.	Muslim City Stop	4
4.	Pubbi Station	10
5.	Pubbi Bazar	15
6.	Peer Peal	9
7.	Khatak Kalay	7
8.	Karemi Bot	6
9.	Kandi Nasir	8
10.	Tarnab Farm	10
Total		82

The key variables covered in the surveys and qualitative interviews include (i) identification and enumeration of the affected population; (ii) demography, (iii) social organization (iv) education and health facilities, (v) occupational structures, (vi) income and expenses level, (vii) access to social amenities, (viii) personal property, (ix) project's impacts on the local communities

4.5.4 Demography of Survey Respondents

a) Gender Composition

Socioeconomic survey was carried out to understand the demographic and socio-economic characteristics of the population in the project area. In order to conduct the socioeconomic survey, eighty-two (82) male respondents were selected from both sides of the proposed road. As per survey, the household size was 7.1 persons per household. The family size clearly indicates that the existence of extended family system is still dominant in the Project Area.

b) Age Group of Respondents

Age is another important demographic characteristic which has a bearing on employment and mobility. A study of distribution of members of households by age will throw some light on the type of strategies which may be helpful in raising their income and employment. About 9% of the population was between 15 to 20 years of age which considered economically inactive. 32% of the population was between 21 to 30 years of age & 46% of the population was between 31 to 45 years of age group and 13% of the population was above 45 years of age group respectively which were engaged in Auto spare parts & Nursery Farm business, Mechanic, Private Employees and daily wages labor. The data regarding the distribution of respondents by age categories is presented in Table 4.14

Table 4.14: Age group of Respondents

Age group	Age group and Population	
	Number	Percentage
15-20	7	9
21-30	26	32
31-45	38	46
46 and above	11	13
Total:	82	100

c) **Education**

Level of Respondents

A person if he could read a newspaper or a journal of the same standard and could write the simple letter in any language defined as a literate in the Census of 1998. Education is one of the key factors in assessing the socio-economic condition of any area and is a more contributing factor than income for uplifting the living standards in society. The literacy rate is barrier with limited educational infrastructures.

Based on sample survey (refer to **Table 4.15**), 62% of the respondent population was illiterate and 38% was literate. In term of education distribution, out of the literate population, 11% of the respondents got the education till primary level (five years of schooling), 6% of the respondents have the education up to middle level (8 years of schoolings), and 6% & 4% of the respondents were matriculates and intermediate respectively. However, 9% & 2% of the respondents had the education till postgraduate levels and Dars -e- Nizami

Table 4.15: Educational Level of Respondents

Sr. No.	Educational Status	Number	Percentage
1	Illiterate	51	62
2	Primary	9	11
3	Middle	5	6
4	Metric	5	6
5	Intermediate	3	4
6	Graduation & Above	7	9
7	Dars -e- Nizami	2	2
Total		82	100

d) Source of Income Respondents

Household income could be the best indicator to assess the actual socio economic situation of the target communities. The majority of the respondents living nearby project area was based on daily wages labor and some of them were doing auto spare parts business, private jobs, livestock rearing and dairy farming to earn their livelihood.

The occupations have been categorized based on primary source of income. The sample survey revealed that the majority of the respondents 55% were engaged in daily wages labor followed by 30% engaged in business / Shop keeping. However, 4% and 11% were associated with private jobs and profession of drivers on public transport respectively. **Table 4.16** below shows the occupation of the respondents.

Table 4.16: Source of Income of Respondents

Sr. No.	Professional Status	Number	Percentage
1	Business/shop	25	30
2	Labor	45	55
3	Private Job	3	4
4	Drivers	9	11
Total		82	100

e) Monthly Income of Respondents

During the socioeconomic survey of the respondents it was observed that majority of the respondents i.e. 61% were earning up to 25,000 per month, whereas 27% were earning between the ranges of 25,001 to 35,000 per month and 6% respondents were earning between 35,001 to 45,000 per month. However, 6% of the respondents were earning above 45,000 per month. **Table 4.17** below shows the average monthly household income of the surveyed respondents.

Table 4.17: Average Monthly Income of Respondents

Sr. No.	Distribution	Number	Percentage
1	Up to 25,000	50	61
2	25,001 to 35,000	22	27



3	35,001 to 45,000	5	6
4	Above 45,000	5	6
Total		82	100

f) Monthly Expenditures of Respondents

Household expenditure depends on the earning of the households. 51% respondents reported their monthly expenditure up to 25,000 due to their low income. However, 37% respondents reported their expenses within the range of 25,001 to 35,000 per month. Whereas, 7% respondents reported their monthly expenditures between the ranges of 35,001 to 45,000 in order to fulfill their family needs, while 5% of the respondents were expensing above 45000 to fulfill their monthly outlays. The information relating to the household expenditure in respect of sample population is shown in **Table 4.18**

Table 4.18: Average Monthly Income of Respondents

Sr. No.	Distribution	Number	Percentage
1	Up to 25,000	42	51
2	25,001 to 35,000	30	37
3	35,001 to 45,000	6	7
4	Above 45,000	4	5
Total		82	100

g) Ownership Status of the Houses of Respondents

Housing is a major element of people's material living standards. It is essential to meet basic needs, such as shelter from harsh weather conditions, and to offer a sense of personal security, privacy and personal space. Good housing conditions are also essential for people's health and affect childhood development. Further, housing costs make up a large share of the household budget and constitute the main component of household wealth.

Regarding the ownership of the houses, findings of the study indicated that 85% of the sampled respondents owned their houses whereas, 15% were residing in the rented houses. Detail of the ownership of the houses is given in the **Table 4.19**

Table 4.19: Ownership Status of the Houses of Respondents

Sr. No.	Status	Number	Percentage
1	Self-Owned	70	85
2	Rented	12	15
Total		82	100

h) Type of Respondents

the Houses of

The Housing conditions of the respondents have been analyzed according to the type of houses in which they were residing. These are categorized as Pacca houses, Semi-Pacca houses and Katcha houses. Pacca, the house or building constructed with concrete and / or bricks fall in pacca category. House or building constructed with burnt bricks and mud comes under semi-pacca category, whereas house constructed with un-burnt bricks and mud, or temporary wooden poles are categorized as katcha category. 91% of the respondents were living in their Pacca houses. 6% of the respondents were living in Semi – Pacca houses while only 2% of the respondents were living in Katcha houses. Detail of housing condition is given in the Table 4.20

Table 4.20: Type of the Houses of Respondents

Sr. No.	Type	Number	Percentage
1	Pacca	75	91
2	Semi-Pacca	5	6
3	Katcha	2	2
Total		82	100

i) Borrowing Status of Respondents

There were two types of credit sources available to the people, formal and informal. The survey revealed that none of the respondent availed the facility of loan. Table 4.21 Shows the barrowing status of the respondents.

Table 4.21: Borrowing Status of Respondents

Sr. No.	Borrowing Status	Number	Percentage
1	Yes.	0	0
2	No.	82	100
Total		82	100

j) Source of Drinking Water of Respondents

Drinking water, also known as potable water, improved drinking water is water safe enough for drinking and food preparation. Access to safe drinking water is not only a basic need and a precondition for healthy life, but is also a basic human right. The quality of water is directly linked to the quality of health.

The findings of the survey indicated that 12% of the households had facility of the drinking water inside their home in shape of public water supply, 12% of the respondents had facility of drinking water inside their homes in shape of bore hole. While, 76% of the respondents use hand pumps in their houses for drinking water. Detail of facility of drinking water is given in Table 4.22.

Table 4.22: Source of Drinking Water of Respondents

Sr. No.	Source of Water	Number	Percentage
1	Public water supply	10	12
2	Bore Hole	10	12
3	Hand Pumps/Electric Motor	62	76
4	Filtration plant	0	0
Total		82	100

k) Satisfaction Level of Water Quality of Respondents

The findings of the survey indicated that 91% of the surveyed population was satisfied with the quality of drinking water while 9% of the population was not satisfied from the quality of drinking water and complaint that water contains polluted and rusted elements due to which not able to drink. Detail of satisfaction level of water quality is given in Table 4.23

Table 4.23: Satisfaction Level of Water Quality of Respondents

Sr. No.	Opinion	Number	Percentage
1	Yes	75	91
2	No	7	9
Total		82	100

l) Mode of Transport

The facility of public transport in the Project Area is very frequent, therefore, about 49% of respondents reported using their own private transport and only 27 % of the respondents were using public transport. While, 24% respondents were enjoying both mode of transport,



including public and private for travel purpose. Table 4.24 describes the mode of transport being used by the respondents during survey.

Table 4.24: Mode of Transport

Sr. No.	Mode of Transport	Household (No.)	Percentage
1	Own Transport	40	49
2	Public Transport	22	27
3	Both (Public & Private)	20	24
	Total	82	100

m) Available Social Amenities in the Project Area

Social infrastructure and amenities are key to creating sustainable communities. This assessment sets spaciousness of a household's dwelling, household amenities like availability of electricity and modern appliances, nature of access to water, fuel for cooking (ease of fetching in what are primarily women's tasks), and type of sanitation facilities available as primary indicators for assessing standard of living.

The result of the survey revealed that 100% of the households had electricity facility while the facility of water supply was available only to 12% of the respondents, basic health unit facility was available to 80% of the respondents. Facility of schooling and mettle road was mentioned by 90% & 70% respectively. However, facilities of mobile service and Sewerage were available to 95% and 28% respectively. The information in respect of access to social amenities and their quality of services is given in Table 4.25.

Table 4.25: Access to Social Amenities in the Project Area

Sr. No.	Social Amenities	Available (%)	Satisfactory (%)
1	Electricity	100	90
2	Water Supply	12	85
3	BHU	80	78
4	School	90	95
5	Mettle Road	70	92
6	Mobile Service	95	100
7	Sewerage	28	95

Source: Field survey

n) Mechanism of Conflict Resolution

During the field survey, discussions were held with the local communities. It was observed that most of activities are carried out under the instruction of the head of a caste/tribe. The decisions about conflicts, right to vote, marriage settlement and other matters are usually



resolved by the heads of the castes/tribes. Sometimes, the conflicts not resolved by the parties are referred to the police or court.

o) Gender Situation

Majority of the women stay home and only travel outside in case of visit to relatives and to hospitals in nearby towns in case of health emergencies.

p) Women Participation

Women have a vital role in maintaining domestic functions. During the field survey, the role of the women about their participation in different activities of daily life was inquired from respondents.

The findings of the survey revealed that participation of women in various household activities in the project area. It was described by the male respondents that the 100% household activities were performed by the females and 100% related to child caring activities as well. In addition, the women representation was 90% in social obligations. Moreover, only 05% females were doing jobs related to teaching and nursing profession. Table 4.26 indicates the women participation level in various activities;

Table 4.26: Women Participation in the Various Activities

Sr. No.	Activities	Participation Level
1	Household	100%
2	Child caring	100%
3	Employment	05%
4	Social obligations (marriage, birthday & other functions)	90%
5	Local representation (counselor /political gathering)	0%

Source: Field Survey



5 STAKEHOLDER CONSULTATION

5.1 GENERAL

Timely and broad-based stakeholder involvement is an essential element for an effective environmental assessment, as it is linked with Project Planning, appraisal and development in general. Public involvement (PI) during Environmental Impact Assessment (EIA) has a tendency to improve project design environmental soundness and social acceptability.

This section describes the outcome of the public consultation sessions held with different stakeholders that may be directly or indirectly affected by the proposed Project. Public Consultation is a mandatory for development projects. The adequacy of the public consultation and information disclosure is one of the basic criteria used to determine the project compliance with the national / international safeguard policies.

Under the proposed Project, public consultations were carried out in the Study Area/Col with the locals, Government Departments and general public. These consultations were carried out from 17th May to 18th May, 2022. The major categories of people who participated in public consultation were the local population and community groups.

The feedbacks and issues raised during the consultation were recorded and documented for developing the strategy. Consultations with Government departments were mostly related to the proposed Project Peshawar (Chamkani) to Nowshera, Addition of Extra Lane on Each Side of N-5 (32 KM), project's legal requirements, associated impacts, availability of requisite baseline information, specific legal requirements, information regarding any future development plans and coordination between the various concerned departments.

5.2 OBJECTIVES

The objectives of stakeholder consultation were to contribute to the openness, transparency and dialogue. Special efforts were made to ensure that the communication with the public should be efficient and well balanced. The concerned stakeholder groups were identified to participate in the assessment process. Specific tasks and purposes of consultations with stakeholders have been given in the Table 5.1.

Table 5.1: Suggested Tasks and Purposes of Consultations

Task	Purpose of Consultation with Stakeholders
Why consultation with the stakeholders?	<ul style="list-style-type: none">• To build trust to ensure sustained support for the Proposed Project and build resilience for times of crisis.• To learn about public concerns that needs to be addressed and taken into account in designing of the project concept and preparation of mitigation measures and programs.• To learn about the strengths, skills and organizations that the stakeholders can bring to support project planning and implementation.



Modes and benefits of consultation	<ul style="list-style-type: none">• Listening and dialogue with stakeholders to keep the project at tuned to public concerns early, to pre-empt breakdowns in public confidence.• Engaging the public as advocates for the project construction and to support the implementation of social, resettlement, environment and health programs.
------------------------------------	--

The objectives of stakeholder consultations were to contribute openness, transparency and dialogue. The concerned stakeholder groups were identified to include in the assessment process.

The objectives of stakeholders' engagement include:

- Informing the stakeholders about the proposed Project;
- Providing an opportunity to those who remained unable to present their views and values, therefore allowing more sensitive consideration of mitigation measures and trade-offs;
- Providing those involved with planning the proposal with an opportunity to ensure that the benefits of the proposal are maximized and that no major impacts have been overlooked;
- Providing an opportunity for the public to influence the project design in a positive manner;
- Increasing public confidence in front of proponent, reviewers and decision makers;
- Providing better transparency and accountability in decision making;
- Reducing conflict through the early identification of contentious issues, and working through these to find acceptable solutions;
- Creating a sense of ownership of the proposal in the minds of the stakeholders; and
- Developing proposals which are truly sustainable.

More intangible benefits flow from the PI as the participants realize that their ideas can help to improve the Project. People gain confidence and self-esteem through taking part in the decision-making process and perceptions are expanded by meeting and exchanging views with people who have different values and ideas.

5.3 STAKEHOLDER IDENTIFICATION

The first step for the stakeholder consultation is the identification of the stakeholders. NHA is the Project Proponent for the proposed Project. As per definition, stakeholder is an entity which is concerned with the proposed Project in any way. Primary stakeholders are those entities which are directly concerned with the Project. The Project has both primary as well as secondary stakeholders.

5.3.1 Primary Stakeholders

Primary stakeholders are those who are directly concerned with the project or directly affected both positively and negatively by the project interventions. The primary stakeholders of this project include land owners, shopkeepers, owners of road side hotels / restaurants and the



proposed Project Affected Persons (PAPs). Apart from this, the beneficiaries of the project and the implementing agency are also primary stakeholders for the proposed project.

5.3.2 Secondary Stakeholders

Secondary stakeholders are people or groups that are indirectly affected from the project activities or have their interest in the proposed Project such Divisional Level Government Departments of Peshawar & Nowshera such as Environmental Protection Department (EPD), Irrigation Department, Wildlife Department, Forest Department, and Social Welfare Department.

The stakeholders identified during field survey were the local residents, shopkeepers, laborers, drivers, private job holders, local Representatives etc. All the stakeholders had different type of stakes according to their professions which are listed down along with their apprehensions. Informal group discussions were also held as an additional tool for the assessment of the perceptions of the stakeholders.

Following is a list of major stakeholders consulted for the proposed Project:

5.3.3 Divisional Level Stakeholders

- Environment Protection Department, Peshawar Division;
- Irrigation Department, Peshawar Division;
- Forest Department, Peshawar Division;
- Wildlife Department Peshawar Division;
- Social Welfare & Women Development Complex Peshawar Division;

5.3.4 Community Level Consultations

- Individual Interviews; and
- Community Consultations;

Consultations with the Divisional Level Departments were carried out through meetings while consultations with locals, community members, directly affected people etc. were undertaken during the baseline survey of the Col. The consultation is an on-going process which should be continued during the project life cycle i.e. even after submission of EIA.

5.3.5 Consultations with Departments

Meetings and consultations were held with officials of different above mentioned Divisional Government Departments. The following points were discussed to provide information about the project:

- Location of the Project area;
- Objectives and purpose of the project;
- Status of land ownership under the impact of the proposed road RoW;



- Status of land ownership under the proposed Project;
- Role of Departments and NGOs;
- Services being provided in the area by NGOs and Departments.

During the meeting the officials extended their full cooperation for the proposed Project and their views were in the favor the project.

5.3.6 Summary of the Consultations

The Summary of the Departmental consultation meeting is shown in **Table 5.2**.

Table 5.2: Summary of Departmental Consultations

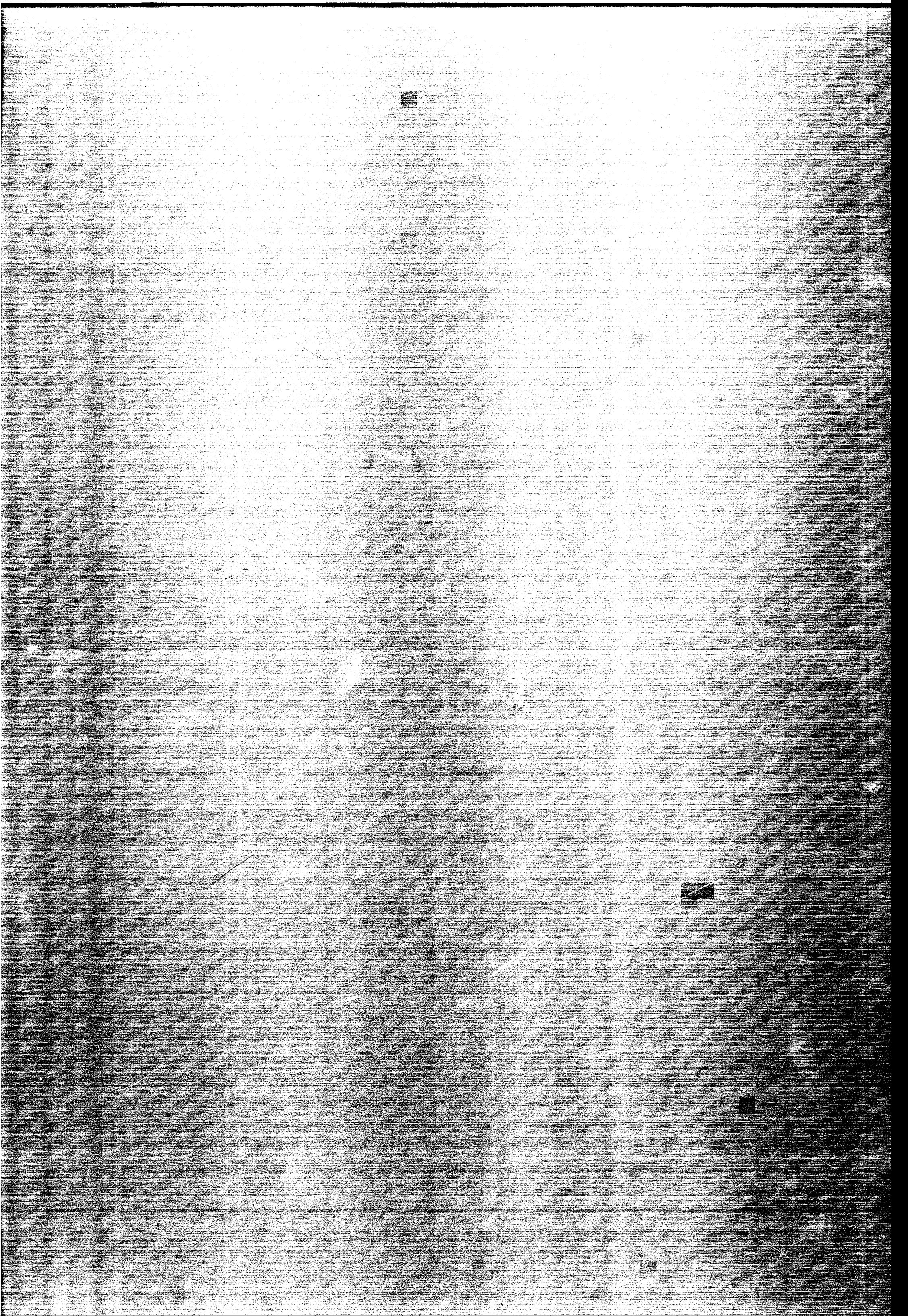
Sr. No.	Department	Name & Designation	Stakeholder Views/Concerns	Response
1	Forest Department, Peshawar Division	Mr. Tariq Khadim, Divisional Forest Officer (DFO)	<p>The DFO was briefed by NESPAC Team regarding the proposed Project and other specifications. The flora and forest of the region was discussed in detail. Following recommendations were made by DFO:</p> <ul style="list-style-type: none"> • Tree cutting should be avoided/minimized to keep the ecological balance of the region. • Compensation for tree cutting should be made as per approved/schedule rates; • Efforts should be made for minimum damages to tree and green cover as the species in the region of the project area are playing important role in soil formation, flood protection and clean environment over all. • Implementation of Tree Plantation Plan for the compensation of trees and to enhance over all environment should be ensured. 	<ul style="list-style-type: none"> • NESPAC team agreed and assured him tree cutting will be minimum. • NESPAC team told the DFO that a plantation plan shall be part of the report and it shall be mandatory for the Proponents to plant 10 trees (at least) as compensation for every single tree. • NESPAC team told him that a proper tree plantation plan would be part of the report with a recommendation that plantation should be carried out through Forest Department and compensation to Forest Department against the tree cutting will be as per law of land.
2	Environment Protection Department, Peshawar Division	Mr. Waheed Khan, Deputy Director	<p>NESPAC team briefed about the Project to Deputy Director. A brief detail of the proposed Project was shared along with the tehseils coming along the proposed Project.</p> <ul style="list-style-type: none"> • It was suggested that proper mitigations must be recommended for the proposed impact due to the project. • Tree cutting should be avoided to the extent possible during the widening of proposed road. • Ensure the sprinkling of water during the construction of proposed road to mitigate the air pollution. 	<ul style="list-style-type: none"> • NESPAC team agreed, detailed Impact Assessment and Mitigation Measures will be provided in this report. • NESPAC team agreed and assured him tree cutting will be minimum. Maximum efforts have been in the design to avoid the trees cutting, however where it is involved, will be compensated fully. <p>Guidelines to prepare the site specific management plans will be provided in the EIA Report. The contractor then prepare the detailed site specific management plan based on these guidelines.</p>

Sr. No.	Department	Name & Designation	Stakeholder Views/Concerns	Response
3	Wildlife Department Peshawar Division	Mr. Muhammad Istar, Divisional Forest Officer (DFO)	<ul style="list-style-type: none"> It was emphasized that waste management plan should be prepared for the Project to protect the environment as much as possible. All the relevant acts, laws, regulations, guidelines especially Khyber Pakhtunkhwa Environmental Protection Act, 2014 should be followed during the preparation of EIA report. Stakeholder Consultations with all the relevant departments should be carried out; and Environmental Monitoring at all environmental sensitive areas along the route should be considered. <p>The official of wildlife department was briefed about the proposed activities of the proposed Chamkani-Nowshera N-5 Road Project. The official shared that No project area is falling under any protected area of wildlife department. Required details of the faunal species of the region were also provided. Following are the suggestions of the concerned official:</p> <ul style="list-style-type: none"> It was suggested that appropriate mitigations measures should be followed during the construction stage to minimize the damage to wildlife and to protect their habitat; and Loss of trees should be discouraged to keep the eco balance and to protect habitat of wildlife of the region as mentioned in baseline. 	<p>Entire concerns / suggestions of the official were recorded and it was briefed that all concerns will be addressed during the design, construction and operation stage of the proposed Project. Efforts will be made to avoid in disturbing the natural habitat.</p>
4	Irrigation Department, Peshawar Division	Engr. Tariq Ali Khan, Superintendent Engineer	<p>NESPAK team briefed about the Project and share the details of the proposed Project. Following are the concerns and recommendations made by the officials:</p> <ul style="list-style-type: none"> Proper safety measures should be taken into account to avoid disturbance to existing irrigation 	<ul style="list-style-type: none"> Concerns noted down and appropriate measures will be taken during the detailed design to minimize these issues. NESPAK team told the Superintendent Engineer that a plantation plan shall be part of the report and it shall be mandatory for the

Sr. No.	Department	Name & Designation	Stakeholder Views/Concerns	Response
5.	Social Welfare Department	Qayum Khan, Deputy Director	<p>channels and nullahs during construction phase; and</p> <ul style="list-style-type: none"> • Tree should be raised along the proposed alignment road; and • Facilities of rest by areas and public toilets for the passengers should be provided. • At Bus Stop, waiting room for passengers should be constructed. • Prayer area must be provided for passengers. • Maximum skilled & unskilled labor should be hired from the local community during the Project construction activities so that local people can take maximum benefit of the project. • Occupational health and safety should be taken care with respect during construction of the road. • Physical and livelihood disturbance should be avoided/minimized. • During the construction period safe movement of the pedestrian should be ensured and proper Traffic Management Plan (TMP) should be devised. • Awareness among the students should be created about the project. Traffic should be managed properly in school hours during the construction work. • Awareness among the population about the risks associated the Project activities and mitigation measures should be adopted. 	<p>Proponents to plant 10 trees (at least) as compensation for every single tree.</p> <ul style="list-style-type: none"> • Concerns and the suggestion were noted down and it was briefed that all concerns and suggestion will be considered in design, construction and operation phase of the project.



Sr. No.	Department	Name & Designation	Stakeholder Views/Concerns	Response
			<ul style="list-style-type: none"><li>• The environment of the most part of Project Area is friendly, but due to construction activities dust & air pollution may lead to respiratory diseases. Medical camp should be established in the area during the period of construction.<li>• The official briefed about advantages of the proposed Project as its implementation will benefit all the neighborhood along the route;<li>• Traffic congestions in the Project Area will be reduced.	





5.4 COMMUNITY CONSULTATIONS

For ascertaining the perceptions of different stakeholders about the project (during/ after construction) meetings were held with local communities and anticipated project affected persons (APs) within the project area of influence. These meetings were held in an open atmosphere, in which participants expressed their views freely. Informal group discussions were also held as an additional tool for the assessment of the perceptions of the stakeholders about the project and potential impacts both positive and adverse likely to occur due to its implementation. The views of the local residents and general public were formally recorded and effort was made to make those beneficial for the Project.

5.4.1 Methods of Community/Public Consultations

The following methods were used for public consultations with project stakeholders in order to ascertain their stakes regarding project implementation. The views of the beneficiaries were formally recorded. The anticipated project APs were consulted along with general public who were residing or working in the COI of the project area.

- Community/Public Consultations
- Individual meetings with anticipated PAPs

5.4.2 Locations of the Public Consultations and Participation

The detail of the locations with number of participation is provided in the Table 5.3.

Table 5.3: Locations of Consultations and Number of Participants

Sr.No.	Settlement	Tehsil	District	No. of Participants
1:-	Nasir Pur Phatak	Chamkani	Peshawar	06
2:-	Pubbi Station	Pubbi	Nowshera	07
3:-	Pabbi Bazar	Pubbi	Nowshera	09
4:-	Khatak Kalay	Nowshera	Nowshera	11
Total Participants				33

5.4.3 Findings of Community Consultations

Extensive consultations were conducted with the local communities and anticipated project APs along the main GT Road to record their views, concerns and suggestions. Four (04) consultative meetings were held with locals in the proposed Project area. The major categories participated in these meetings were shopkeepers, community groups, landowners, and particular project anticipated APs. All participants were briefed about the importance of the project and its impacts.

During the consultations, it was assessed that mostly people were aware about the project, its benefits and adverse impacts. During discussions, participants have shown keen interest in discussion, gave valuable suggestions and also raised various questions. The local people



expressed their willingness and cooperation with the project staff during survey and implementation of the project.

The question raised and response given are provided in **Table 5.4** whereas, list of participants has been provided in the **Annex-IV**. Moreover, pictorial view of the community consultations, data collection and other filed activities is depicted as Photo log

Table 5.4: Concerns and Responses during Public Consultation with Stakeholders

Sr. No.	Questions/Concerns Raised By Participants	Responses of Team Consultant
1	What will be the exact location of the proposed addition of extra lane on each side?	The participants were briefed about the location of the proposed addition of extra lane on each side through project maps and awareness drawings.
2	Is there any land acquisition involved due to widening of the road or civil work will be carried out in existing RoW of NHA?	It was explained to the participants that the entire construction work for the widening of the road will be carried out in the RoW of the NHA. On the other hand, where proposed RoW exceeds the limits of existing RoW, land will be acquired.
3	What will be the proposed RoW for the addition of extra lane on each side on the main road?	Proposed RoW was briefed through project maps to the participants of the consultations.
4	Disturbance of community places/ structures like mosques.	Measures will be taken to avoid these sensitive receptors especially mosques.
5	Due to number of accidents on this road on daily basis, many injuries and casualties take place on this road.	It was briefed that widening of the road is proposed by keeping in view the respective issues. Moreover, NHA's Project Implementation Unit (PIU) and Construction Supervision Consultants (SCs) will ensure installation of signage, U-turns during construction. Highway Police will be enforcing highway rules and speed limits to reduce the incidence of accidents.
6	Inadequate drainage for seasonal rain crossing.	The design engineers will ensure construction of designed number of cross drainage structures and review the requirements for further improving drainage facilities.
7	Local skilled and unskilled labor should be employed in the project construction work as well as in office work.	Employment opportunities will be created during construction. The bidding documents will include provisions for engaging local labor and contractors will provide jobs to the locals on priority basis.
8	Crossings, pedestrian bridges, bus stops with partition for men and women should be built for the local community along the road at suitable locations.	The crossings have been included in the detailed design for all appropriate locations. Moreover, depending upon the site situation the requested facilities may be adjusted in the design.
9	Due to construction activities as well as influx of labor, movement of the citizens particularly of females, residing in the nearby areas will be restricted.	In order to tackle this situation, construction should be carried out in scheduled hours. So that after construction hours, local community, particularly females can easily move in the area.
10	Dust and noise during construction	All protective measures should be taken to



Sr. No.	Questions/Concerns Raised By Participants	Responses of Team Consultant
	activities will disturb the local community.	manage the dust and noise during construction phase of the proposed Project.

5.5 GENERAL OPINION OF CONSULTED COMMUNITIES

In general, the consulted communities and officials consider the Project beneficial for the area. Due to addition of extra lane on each side of N-5 (32 KM) from Peshawar (Chamkani) to Nowshera will reduce the traffic congestions, improve transportation facilities as well as the allied sectors will be benefitted. Indirect benefits include employment opportunities for the locals and industry will also increase in project area, resulting in the increase of income and reduction in poverty. Participants demanded less impact on commercial activities by adopting proper protective measures.

- o Civil work should be completed in the shortest possible time to avoid the adverse impacts on the daily activities and health of the people.
- o Impact on commercial structures should be minimize and if not avoidable proper resettlement compensation should be given.
- o Sign boards should be provided along the construction site.
- o Proper arrangements should be done to avoid construction hazards.
- o The local communities during the stakeholder consultations have shown great desire to be included in the project's workforce.

5.6 STAKEHOLDER CONSULTATIONS FRAMEWORK FOR CONSTRUCTION AND OPERATION PHASE

Key stakeholders of the Project include provincial and district level government departments such as NHA, EPD, Agriculture Department, Forest Department, Wildlife Department, Irrigation Department, Social Welfare Department, Project DPs and local people. The community members will be compensated by project proponent and they will be encouraged to participate in project activities during construction and operation phases. The consultations are recommended be made in future to facilitate the community at the local level.

The consultations should be carried out during the construction and operation phases of Project. Efforts are recommended to maximize the consultations during the project implementation. The consultations will be carried out with the objectives to develop and maintain communication linkages between the project promoters and stakeholders, provide key project information to the stakeholders, and to solicit their views on the project and its potential or perceived impacts, and ensure that views and concerns of the stakeholders are incorporated during the implementation with the objectives of reducing or offsetting negative impacts and enhancing benefits of the proposed Project. The framework for the future consultations is elaborated in **Table 5.5:**



Table 5.5: Future Consultations Framework

Sr. No.	Stakeholders	Project Phase	Frequency of Consultation
1	Provincial Government Departments	<ul style="list-style-type: none">• Pre-Implementation• During the Project Implementation	<ul style="list-style-type: none">• One round of consultation before start of implementation of project.• Monthly during construction phase and bi-annually during operation phase of the project.
2	District Level Government Officials	<ul style="list-style-type: none">• Pre-Implementation• During Project Implementation	<ul style="list-style-type: none">• One round of consultations before start of implementation of project.• Monthly during construction stage and bi-annually during operation phase of the project.
3	Surrounding Villages	<ul style="list-style-type: none">• Pre-Implementation• During Project Implementation	<ul style="list-style-type: none">• One round of consultation before start of implementation.• Quarterly during construction stage and bi-annually during operation phase of the project.
4	Local Elders	<ul style="list-style-type: none">• Pre-Implementation• During Project Implementation	<ul style="list-style-type: none">• One round of consultations before start of implementation of project.• Monthly during construction stage and bi-annually during operation phase of the project.



5.7 GRIEVANCE REDRESS MECHANISM (GRM)

The GRM will address grievances arising from environmental and social impacts. This section shows the structure, roles and functions of the GRM, to address the grievances arising during the execution of works. The purpose of the GRM in environmental and social matters is to receive, review and resolve grievances from affected persons and thereby, facilitate the fair implementation of this EIA by NHA and to resolve the community concerns raised during execution of project works.

At first instance, the efforts will be made to avoid grievances through strong consultations participation and information disclosure strategy and the activities will be conducted in accordance with this EIA provisions. Nevertheless, it may be expected that some problems cannot be resolved through CPID actions and, therefore, APs require an accessible and effective GRM. The project will put in place its GRM structures from the beginning of its implementation, i.e., as soon as activities for project design and preparation or implementation of EIA commence. The GRM will remain intact throughout project implementation period to address the community concerns and issues arising during execution of project works.

Problems or complaints to be addressed by the GRM during the planning or implementation of the project EIA are generally about environmental and social impacts.

The formal GRM provided for this project has a two-tiered structure including: i) Local/PIU level grievance redress set-up; and ii) Higher level GRM at PMU/EALS in NHA HQ. The recording and redress of the grievances will be ensured at PIU level and a higher level GRM at PMU/EALS level in NHA will review and address more difficult cases that are not resolved at the PIU level. Thus, the GRM will enable to resolve grievances at local/project level by mobilizing local recourse and providing a higher-level review system to address more difficult and complex issues that are not resolved at the PIU/local level. To ensure that all geographic reaches and relevant administrative units involved in the project are covered under the GRM, it will set-up (i) a local level mechanism with grievance redress focal points in each affected village; and (ii) grievance redress committees (GRC/s) at PIU level and the PMU/ELAS level, as applicable. The functions and responsibilities for each level of GRM are explained below.

5.7.1 Local/PIU Level GRM

The establishment of a project-based GRC headed by the Project Director (PD) at PIU level will be a formal grievance redress system responsible for recording, review and redress of safeguards related complaints and issues encountered during implementation of EIA and execution of the project works at site.

PIU Level GRC: If the grievance is not resolved at informal level of GRM explained above, it shall be raised to formal GRM which is first level of the two-tiered GRM established for the project. A formal complaint will be tendered with the Project GRC by the aggrieved APs in person or through the village level focal point i.e. the DPC/social mobilizers. A complaint register will be maintained by the GRC through Deputy Director / Assistant Director to record complaints received and updated status on resolution of recorded grievances. The complaint



record register will include information about the complainant (name and contact details), complaint receiving date, gist of issues raised, findings and the decision by GRC with its communication date to the APs along with status on implementation of GRCs decision or forwarding of complaint to next level of GRM in case of disagreement by the aggrieved APs.

Once the complaint is submitted with the Project GRC, it shall record it in complaint register and send acknowledgement to the affected person without delay. The GRC will initiate the process of investigation within 7 days (from complaint receiving date) through its technical and environmental field teams. After receipt of directions from the GRC, the field teams including environment specialist will coordinate with complainant and complete its investigation of facts in consultation with aggrieved person, DPC representatives and local community. The field investigation team will compile and submit its fact-finding report and recommendations to the GRC in 15 days from the receipt of complaint. Upon submission of the fact-finding report, the GRC will summon and hear the aggrieved person and decide the complaint based on recorded facts and suggested remedial measures provided in the EIA report. The GRC will communicate its decision to the PIU/PMU and APs within 15 days from submission date of fact finding report. On an overall basis the GRC will decide the grievances within 30 days of receipt of complaint in GRC. If the final decision made by GRC is not acceptable to the APs they may advise GRC for elevation of their grievance to next higher level of GRM. However, the project based GRM will not bar aggrieved persons to avail remedies available under the court of law and they will be at liberty to approach the court of law as and when they wish to do so.

5.7.2 Higher (PMU/EALS) Level GRM

In case the AP (s) is unsatisfied with GRC decision, he himself or through GRC can elevate his complaint to the second level of GRM i.e. at PMU/EALS in NHA HQ, within 7 days after communication of disagreement by the aggrieved AP about GRC decision on complaint. Once the complaint is received at PMU/EALS along with GRC proceedings, it will be registered and the complainant will be informed accordingly. The GRC record and complainants' claim will be scrutinized and the complainant will be advised to produce any additional record in favour of his claim by the responsible staff in PMU/EALS at NHA level. After thorough review and scrutiny of the available record PMU/ EALS can visit the field to meet the complainant, collect additional information and evidence if required. Once the investigations are completed the PMU/EALS shall get its recommendations approved by Member (aided projects) and forward them to the PD and the complainant accordingly within 30 days of receipt of the complaint. Moreover, the aggrieved person/party (s) will be free to go to the Court of Law as and when desired.

5.7.3 Constitution and Function of the GRC

The project based GRC will be at the subproject level in PIU for with the primary objective to provide a mechanism for mediating conflicts and cutting down on lengthy litigation. It will be a public forum for raising concerns and invoking conflict resolution system available within the project for addressing social or environmental issues adequately. The GRCs will continue to function, for the benefit of the APs, during and after implementation of EIA till completion of



the project. The GRC will maintain a log of complaints and grievances received, recorded and addressed.

The GRC will be headed by the PD including DD/ AD (environment) as member and focal person for social and environmental grievances, the environment safeguard expert mobilized through supervisions consultants as members.

For redress of grievances, the GRC will meet at least once in a month. GRC will perform following functions:

- Record grievances of APs; categorize and acknowledge the APs about receipt of grievances; investigate the issue and summon aggrieved persons/parties to produce the evidence and explain their claims; and resolve the grievances within stipulated time frame preferably in 30 days;
- Communicate its decisions and recommendations on all resolved disputes to Project executors and the aggrieved persons for implementation and follow the implementation progress;
- Forward the un-resolved cases, at its own or as required by the unsatisfied aggrieved parties, to PMU (second level of GRM) within an appropriate time frame with reasons recorded and its recommendations for review and resolution at second level of GRM;
- Develop an information dissemination system and acknowledge the aggrieved parties about the development regarding their grievance and decision of PIU and PMU level;
- Maintain a complaint register accessible to the all stakeholders with brief information about complaints and GRC decision with status report; and
- Maintain complete record of all complaints received by the GRC with actions taken.

5.7.4 Information Dissemination and Community Outreach

In synchronization with on-going consultative process the GRM will also develop an information dissemination system. The APs will be informed about the GRM, its functioning, complaint process to GRC and EALS at HQ, contact details of the focal members of the GRM at both levels. The GRC will send acknowledgement to complainants about receipt of complaint and to inform him about its site visit plan to ensure complainant is present during site visit, and provide update on the progress made to resolve his complaint/ grievance. Besides this formal communication the Environment/Social Specialist in the field will maintain a close liaison with the complainants through DPCs at village level and provide them the requisite information on the GRM and updates about the status of complaints under process with GRC or the PMU/EALS whatsoever the case may be.

The aggrieved AP(s) will be kept informed about the actions on his complaint throughout the grievance resolution process and the aggrieved persons will be facilitated to attend and participate in the proceedings at different levels of grievance resolution process. The grievance flow mechanism and resolution process are summarized in the **Figure 5.1** below.

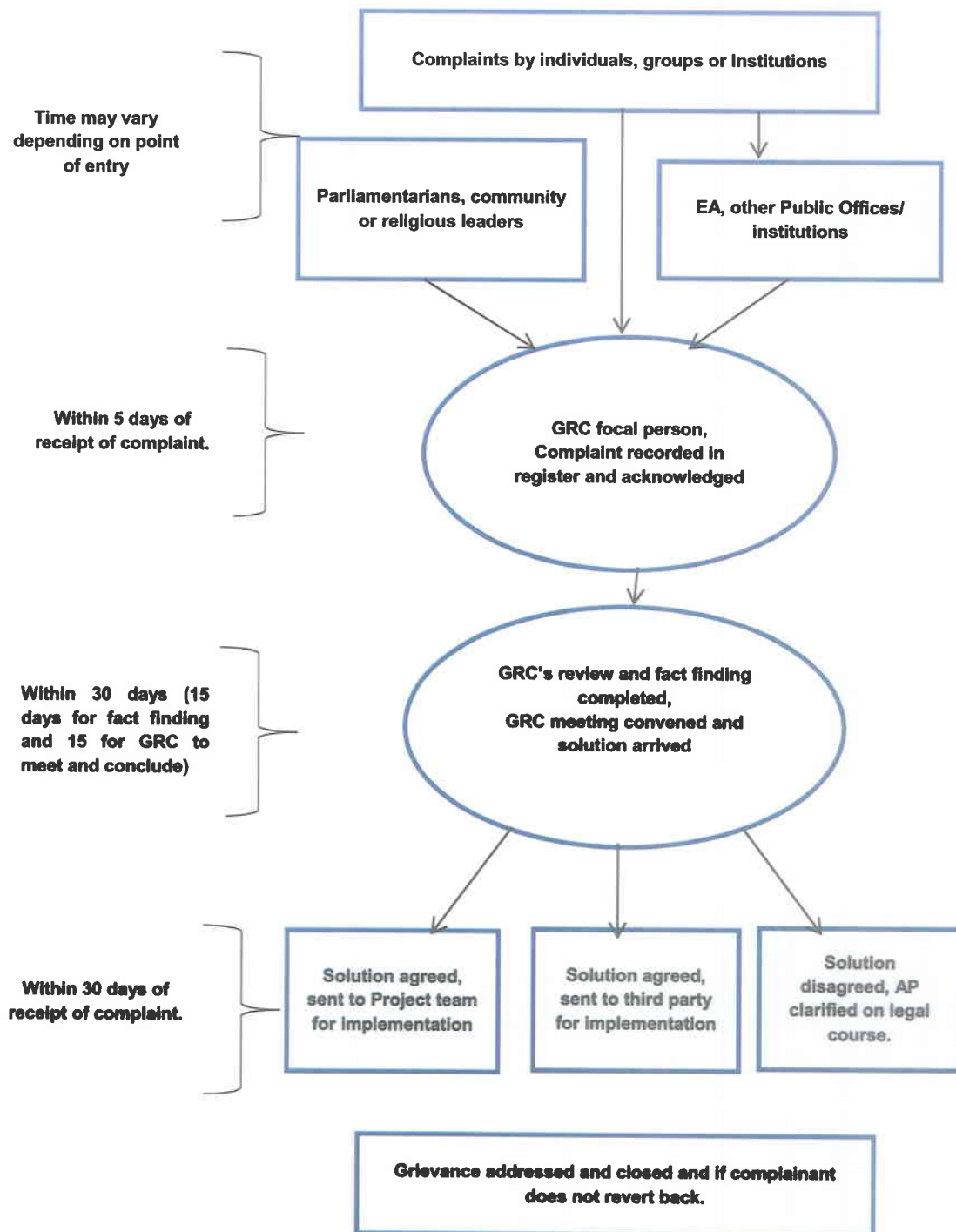


Figure 5.1: Grievance Resolution Flow Mechanism with Time Frame



6 ANTICIPATED IMPACTS AND MITIGATION MEASURES

6.1 GENERAL

This chapter identifies the beneficial as well as the potentially significant adverse environmental and social impacts during design/pre-construction, construction and operation phases of the proposed Project on the physical, ecological and socio-economic domains of the environment. The appropriate mitigation and remedial measures are proposed in this chapter. A project impact evaluation matrix has been developed to evaluate the potential impacts of the proposed Project. A brief qualitative description of each aspect and the affected environment in both RoW and the project's Col is presented below.

6.2 NOTION OF SIGNIFICANCE

The term "*Environmental Impact*" or simply "*Impact*" covers the negative, adverse or harmful as well as positive, desirable or beneficial impacts of the project on environmental settings. Prediction of impacts of the proposed activity is based on factual data; however, the significance of these impacts involves a value judgment technique. The nature of the impacts may be categorised in terms of:

- Direction** - Positive or Negative
- Duration** - Long or Short Term
- Effect** - Direct or Indirect
- Extent** - Wide or Local

Impact significance depends on both the nature of the impact and on the sensitivity of the receptor. The more sensitive the receptor the greater will be the significance of impact from that proposed activity. For this EIA, activities and nature of impact are combined with the sensitivity of the receptor to evaluate the significance of the impact. The significance of impact is characterized as very low, low, moderate, high and very high. Environmental issues having "moderate", "high" and "very high" significance are provided with mitigation measures.

Following the assessment of magnitude, the quality and sensitivity of the receiving environment or potential receptor has been determined and the significance of each potential impact established using the impact significance criteria matrix as shown below. Most of the potential impacts can be mitigated by implementation of various types of mitigation measures; however, some residual environmental impacts may remain after mitigation.

Magnitude of Impact	Sensitivity of Receptors			
	High (4)	Medium (3)	Low (2)	Negligible (1)
Major (4)	8	6	4	2
Moderate (3)	8	6	4	2
Minor (2)	8	6	4	2
Negligible (1)	8	6	4	2



Score	Impact Significance
1	Negligible
2 – 4	Low
5 – 8	Medium
9 – 12	High
> 12	Very High

6.3 METHODOLOGY FOR IMPACT EVALUATION

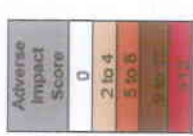
The methodology adopted for the evaluation of the impacts included the following assessment tools, (i) project impact evaluation matrix and (ii) overlays. These tools were used to identify the significance and magnitude of the impact as well as the nature, reversibility, extent etc.

a) Project Impact Evaluation Matrix

The Impact Evaluation Matrix was developed by placing project activities along one axis (i.e. Y-axis), and on the other axis (i.e. X-axis) the different environmental parameters likely to be affected by the proposed Project actions grouped into categories i.e. physical, ecological and socio-economic environment. For the impact assessment, project impact evaluation matrix was used by dividing the project action into different phases (design/pre-construction, construction and operational phases). A Project Impact Evaluation Matrix is given as **Table 6.1, 6.2 and 6.3.**

Table 6.1: Project Impact Matrix

Environmental Component	Physical Environment										Ecological Environment									Socio-Economic Environment											
	Soil (Erosion/Stability/Contamination)	Air Quality	Noise Level	Surface & Ground Water Quality	Solid Waste Generation	Aquatic Ecosystem	Terrestrial Ecosystem	Endangered Species	Migratory Birds	Loss of trees	Loss of Crops/Orchards	Contact over Resources	Mobility of Locals	Public Infrastructure	Accessibility	Housing Infrastructure	Regional Structures	Community Stability	Tourism And Recreation	Grazing Area	Gender Issues	Cultural & Social Issues	Health Safety	Aesthetic	Security Situation	Living Standards	Employment Opportunities	Restoration of Livelihood	Economic Uplift		
A. Planning & Design Phase																															
Topographic Survey	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Geotechnical Investigation	0	0	2	3	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2	4	0	0	0	0	0		
Temporary Acquisition of Land	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0		
Permanent Acquisition of Land	0	0	0	0	0	0	0	0	0	0	0	6	0	6	0	8	0	0	0	0	0	0	0	0	0	4	6	0	0		
B. Construction Phase																															
RoW / Site Clearance	0	0	0	0	0	0	0	0	0	0	0	0	6	6	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0		
Earthwork in Filling and Excavation	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	6	8	0	0	0	6	0	4		
Establishment of Construction Camps & Workshop	2	2	4	0	0	0	0	0	0	0	8	0	0	0	0	0	0	4	0	0	0	7	9	4	0	0	6	0	4		
Transportation & Storage of Construction Materials	4	6	6	4	6	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	4	8	4	0	0	6	6	6		
Use of Construction Material and Heavy Machinery	3	8	0	0	4	0	0	0	0	0	0	0	8	0	0	0	0	4	0	0	0	6	6	4	6	0	4	0	0		
Installation and Operation of Batching and Asphalt Plants	4	8	8	2	4	0	4	0	0	0	0	2	4	0	0	0	0	0	0	0	0	6	6	4	0	0	4	0	0		
Spill Disposal	3	3	0	6	6	0	6	0	0	0	0	0	0	0	0	0	0	2	0	0	0	6	6	4	0	0	4	0	0		
Structural & Civil Work	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	6	4	6	0	0	0	0	0		
Drainage Work	0	0	0	0	0	0	0	0	0	0	2	6	2	6	0	0	0	2	0	0	0	6	6	4	0	0	8	0	8		
Miscellaneous Work (Road Ancillaries, Traffic Signs and Signals etc.)	0	4	6	4	4	0	0	0	0	0	2	0	2	0	0	0	0	2	0	0	5	4	9	4	0	0	8	0	8		
Pavement Work	2	4	6	2	4	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	6	0	0	0	6	0	6		
Finishing and Comissioning	0	2	4	0	4	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	0	0	0	0	4	0	4		
C. Operational Phase																															
Operation of Road	0	2	2	0	0	0	0	0	0	0	0	6	4	8	0	0	0	6	4	0	0	8	8	7	0	0	8	6	6		
Inspection & Monitoring	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	6	0	0	0	4	0	0		
Road and Bridge Maintenance	0	4	4	2	0	0	2	0	0	0	0	4	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Maintenance of Miscellaneous Work	0	0	2	0	0	0	0	0	0	0	0	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4		





b) Overlays

In order to identify spatial based impacts, overlays were used. An overlay is based on a set of transparent maps, each of which represents the spatial distribution of an environmental characteristic (for example, land use). Information for an array of variables such as land use, infrastructure, vegetation etc. was collected for the standard geographical units within the project's Col, recorded on a series of maps, typically one for each variable. These maps were overlaid to produce a composite map. The resulting composite maps characterize the Project area's land use, physical, social, ecological and other relevant parameters related to proposed intervention. The overlays maps used in this EIA study for the quantification of the land use categories is referred in Chapter 4.

6.4 DELINEATION OF PROJECT CORRIDOR OF IMPACT (COI)

Before proceeding to the environmental analysis of the Project, it is imperative to delineate the Col. Col has been used for the environmental baseline information, impacts assessment and mitigation purposes and is described briefly below.

For a linear Project, Col is a limit that identifies the area where direct and indirect impacts of the project activities are envisaged. Col also includes the RoW. This is limited to 32 feet m from the RoW each side for collection of baseline information, impacts assessment and mitigation measures of physical, ecological as well as social resources.

Apart from the Col, which is along the centerline, some components are non-linear such as the Construction/Contractor camps, vehicle, equipment yard, material quarry areas, while access tracks are also considered part of the Col for the study and termed as Project Area or Area of Influence. Therefore, in this report Col the Study Area and Area of Influence are used accordingly.

The location of Construction/Contractor camps, vehicle, equipment yard, material quarry areas and access tracks are usually finalized by the Contractor. Some of the project components which are not finalized yet, the assessment for those components is generic in nature and will be updated accordingly as the more information is made available.

6.5 RIGHT OF WAY (ROW) / PROJECT AREA

RoW is the corridor where direct impacts of the proposed Project are anticipated. In the RoW there will be direct impact on the environment like relocation of the physical infrastructure, clearing of vegetation, cutting of trees, loss of crops due to the road construction and some indirect impacts on shrubs, ornamental trees etc. are also envisaged. Existing RoW of the N-5 road from Chamkani to Nowshera Section is approximately 220 feet.

6.6 POTENTIAL POSITIVE IMPACTS

The positive impacts due to the proposed Project are mentioned below:

- Smooth flow of traffic;



- Saving of vehicle travel time and vehicle operating costs of commuters;
- Reduction in traffic accidents and casualties by traffic congestions;
- Efficient movement of trade, goods and traffic in relatively shorter time;
- Quicker transports of agricultural products including perishable goods to final destination;
- Reduction in the fuel consumption and transportation cost caused by traffic congestion and bumpy roads;
- Reduction in air emissions from vehicular exhaust especially in case of traffic congestion; and
- Increase in economic growth by providing employment opportunities to the local residents and vendors.
- The proposed Project is primarily aimed to enhance capacity and efficient road facility to cater the travel demand to help and relieve this important section by alleviating congestion and traffic load.

6.7 POTENTIAL ADVERSE ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Apart from positive impacts, there are some potential significant adverse environmental impacts on the local environment. The proposed Project is divided into three (03) phases i.e. Pre-construction / Planning and Design Phase, Construction Phase and O&M Phase. The Pre-Construction Phase includes all phases before the construction Phase (i.e. site investigation work i.e. topographical, seismic studies etc.); Construction Phase includes all phases from mobilization of Contractor to the completion of Project; and Operation Phase starts after the Construction Phase which includes the inspection and repair works.

Adverse impacts envisaged at these three (03) phases of the proposed road project along with their proposed remedial or mitigation measures are detailed below:

6.8 POTENTIAL ENVIRONMENTAL IMPACTS DURING PRE-CONSTRUCTION PHASE

Following is the brief description of potential environmental impacts envisaged and the recommended mitigation measures during Pre-construction phase.

6.8.1 Technical Design and Layout Planning

Potential Impacts

Incompatible layout plan and engineering design of the project's structures can undermine the overall aesthetic beauty and ambience of the project area. Also designing the structures without considering the prospective and futuristic needs can result in structures with low social acceptability and functionality.. Similarly, the locals may also face access problems for their land. This impact is temporary and minor negative in nature.

Mitigation Measures



- The technical design of the proposed Project must consider all the above-mentioned factors for the final design and should meet all the local and international standards;
- The proponent must review and validate all the design considering the possible impacts (as mentioned) before the start of construction of proposed Project; and
- Design of bridges may also be considered to facilitate the locals so that they can access their land.

6.8.2 Topography

Potential Impacts

The project involves an additional lane to the existing section of N5, however, some new structures (bridges and flyover) will be constructed. Thus, there will be minor change in topography of project area.

Mitigation Measures

Mitigation measures will involve adoption of best engineering design measures keeping in view of the aesthetics of the project area and provision of green areas for the landscape in design.

6.8.3 Drainage

Potential Impact

The current conditions of road drainage are not satisfactory. Stagnant water was observed on the road which results in following impacts:

- Deterioration of road surface and reduction of its bearing capacity;
- Inconvenience for commuters/pedestrians;
- Stagnant water may provide the breeding ground for disease vector; and
- Foul odour may be generated.

This impact is moderate negative in nature.

Mitigation Measures

Mitigation measures will include repair of existing drainage structures, provision of appropriate new drainage structures with suitable design capacity to avoid flooding especially during the rains. Proper slopes shall be incorporated in design to avoid the stagnant water on at-grade road surface.

6.8.4 Seismicity

Potential Impact



The project area is located in Seismic Zone 2B, where 2B (upper limit of moderate damage) represents peak horizontal ground acceleration from 0.16 to 0.24 g. In this Zone, designing of various types of structures should be done on the basis of Peak Ground Acceleration (PGA). A low to moderate intensity earthquake impacting the project site can adversely impact the development. This impact can be categorized as direct, medium, site-specific, long term, permanent, medium probability and irreversible. The impact significance is medium adverse.

Mitigation Measures

The proposed project and the associated structures should be designed and constructed as per Seismic Building Code of Pakistan 2007 (SBC-07) to comply with minimum requirements for seismic safety of structures.

6.8.5 Resource Conservation

Potential Impact

Resources involved in the construction of proposed Project would include water, fuel and construction materials.

Excessive water consumption by the construction staff may stress water resources in the project area and in certain cases may disturb the existing water supplies in the project area.

Construction material to be used for construction includes coarse aggregates, fine aggregates, asphalt, cement, lining material, earthworks, reinforced and structural steel etc. Almost all the materials to be used in the construction of proposed Project are non-renewable and therefore their efficient use is necessary for the future use.

Fuel will be used to operate construction machinery. Efficient use of energy resources is important to reduce air emissions. For conservation of energy, efficiency of the engines and burning processes is important. The impact is minor negative.

Mitigation Measures

Following practices shall be adopted to conserve these natural resources:

- Use of potable water bowsers for construction works and mineral water bottles/ground water for drinking purpose;
- Plan for the provision/purchase of adequate insulation to reduce heat loss through batching plants;
- Reduction of wastage of water through training of workers involved in water use;
- Reuse of construction waste materials may be adopted wherever possible;
- Diesel and fuels with low sulphur content should be used to operate construction machinery and equipment;
- Efficient and well maintained equipment and machinery should be used;
- The equipment and machinery should be turned off when not in use;
- Ensure adequate insulation to reduce heat loss through batching plants;



- Regularly monitor CO and CO₂ content of the flue gases to verify that combustion systems are using practical excess air volumes;
- Use of solar panels at construction camps may be considered and plan for use of solar panels at operational phase may also be considered; and
- A good camp design and an efficient worksite management plan can help the contractor to reduce the water demand, wastewater and solid waste volumes to the lowest levels

6.8.6 Change in Hydrologic Regime

Potential Impacts

The proposed Project comprised of around eighteen (18) bridges over storm drains and nullahs. Construction of bridges and road widening might cause a change in water flow pattern and disturbance to water flow that will lead to create an impact on downstream of these drains and nullahs.

Mitigation Measures

Bridges shall be properly designed to accommodate design flows. Provision of culverts to control flood damages and provision of safety of embankments will be considered during the design phase.

6.8.7 Flora

Potential Impacts

During the pre-construction phase, activities such as installation of construction camps, construction of temporary roads & mobility of construction staff may damage the local vegetation/trees. As the heavy machinery and camps will be moved and installed, which require significant space due to which available vegetation is expected to be removed. This impact is Site-specific, Permanent, Irreversible, Possible, Medium Significant and needs to be encountered prior to the start of construction stage.

Mitigation Measures

- The camps, mobility of machinery and construction of temporary road should be proper planned and well designed to avoid any loss to local green cover;
- It is recommended to establish the construction camps where no or minimum vegetation exists.
- Similarly, the alternate routes for roads and points for camps are recommended where no loss of vegetation is expected; and
- The location of construction camp should be selected so, as to have limited environmental impact during construction phase and to reduce the cost and land requirement.

6.8.8 Fauna

Potential Impact



As movement and installations of machinery and vehicles will take place so, noise and habitat loss is expected. The routes of the available wildlife and other habitats may be affected due to camps set-up and machinery movements and installations. Temporary road may also affect the habitat of locally available fauna. This impact is Site-specific, Temporary, Irreversible, Possible and Low Significant.

Mitigation Measures

- The standard measures must be adopted to minimize noise due to machinery movements and installations.
- Wildlife movements and routes must be considered during activities and should be avoided to their maximum level.
- The alternate routes and points are recommended to avoid any damage to locally available fauna.
- The camps shall be properly fenced and gated to check the entry of animals in search of eatable goods.
- Similarly, wastes of the camps shall be properly disposed of to prevent it being eaten by animals, as it may be hazardous to them.

6.8.9 Land Acquisition

The RoW for the proposed Project is already available and owned by NHA, therefore, no land acquisition will be involved for the proposed Project.

Mitigation Measures

No mitigation required.

6.8.10 Renting / Leasing Land

Potential Impacts

The Contractors will require renting / leasing for:

- The development of Contractor camps and facilities i.e. storage, workshops, equipment parking and washing areas;
- Aggregate quarries; and
- Access roads/tracks for haulage, transportation etc.

The approximate area required for the establishment of one Contractor's camp facilities will be 1500m² at the different locations. Land utilization for project activities and subsequent operation of project may induce temporary as well as permanent changes in the existing landuse pattern. This impact can be categorized as direct, low, site-specific, short term, temporary, medium probability and reversible.



Mitigation Measures

It is the foremost option to establish the Contractor camps at the acquired land to eliminate the issues of land leased etc. However, if this option is not feasible than the land for above mentioned facilities should be selected and leased prior to the start of construction phase.

Land for above mentioned facilities will be directly rented from the private landowners by the Contractors. The provisions of the LAA, 1894 will not be involved as the acquisition of the land will be renting / leasing and will be covered by short-term lease agreements between the landowners and Contractor. Rental terms should be negotiated to the satisfaction of the concerned landowners and the agreement should be in local language to make the process clear.

In addition, these project facilities should be located at a minimum distance of 500 meters from the existing settlements, built-up areas, archaeological and cultural monuments as the case may be. Prior to the commencement of the construction activities, the Contractor should submit a construction camp development/management plan to the Engineer-in-charge and the EPA, KP (if required) for its scrutiny and approval. As far as possible, waste/barren land i.e. areas not under agricultural or residential use and natural areas located at high elevation should be used for setting up the contractor camps.

6.8.11 Physical, Religious and Cultural Resources

According to the field survey, various mosques, graveyards, schools and hospitals are coming under the Col. All these structures will be directly affected and demolishing of these structures may cause serious social issues. The location of these sensitive receptors (structures) are shown in **Figure 4.11**. This impact is permanent and highly negative in nature.

Mitigation Measures

Due consideration shall be given to minimize the adverse impacts on the religious and community structures and places. The effort will be made by making changes in design (where possible) to avoid the sensitive and religious structures and to minimize the issues at possible extend. If needs demolishing and shifting of graveyards, a mechanism will be developed with the community consultation and proper consultations and coordination's with locals will be carried out to resolve this sensitive issue.

6.8.12 Public Utilities

Potential Impacts

Due to the proposed Project, public utilities (transmissions lines, PTCL exchange/ transmission system, gas pipelines, water supply, sewerage and drainage pipe lines etc.) may be affected creating disruption of public services and inconvenience to the local residents. This impact is medium adverse in nature.



Mitigation Measures

Mitigation measures will include:

- The provision in the design and budget for the relocation of the existing utility infrastructures wherever required shall be finalized in consultation with the concerned department; and

All public utilities likely to be affected by the proposed Project will be relocated well ahead of time before the actual commencement of the construction work

6.9 ADVERSE IMPACTS DURING CONSTRUCTION STAGE

6.9.1 Traffic Issues

Potential Impact

The proposed road will be approached through various major roads as mentioned in Section 3.8 and 6.9.1. These roads serve as main approach roads to the proposed Project Area and due to the proposed construction activities and movement of heavy project vehicles for construction material supply, traffic problems may arise for the commuters and transporters travelling to the proposed areas. The problems will include traffic jams and inconvenience to the public passing through the Project Area. It will also increase traffic load on the existing road network or access roads ultimately deteriorating the existing conditions of the roads. The movement of vehicles along the haulage routes will cause soil erosion, debris flow, dust emissions, vibrational impacts, etc. Considering these consequences, this impact can be categorized as medium adverse in nature.

Mitigation Measures

To minimize traffic problems in the proposed Project area, following measures will be considered:

- Movement of vehicles carrying construction materials and equipment/machinery will be restricted during the daytime to reduce traffic load and inconvenience to the local population;
- Construction vehicles, machinery and equipment will be parked at designated areas (at construction camps site) to avoid un-necessary congestions along the major roads;
- The speed of the vehicles will be controlled (at 30 to 40 km/hr) to reduce the probability of severe accidents, soil erosion, debris flows due to vibrations and dust emission;
- Damages of roads due to construction vehicles will be instantly repaired and/or compensated after the completion of work;
- Period of construction and area / location of construction site shall be informed to public in general and specifically to local residents; and



- Any closure of the roads (especially main roads) and deviations / diversions proposed should be informed to the riders through standard signs and displays.

Traffic Management Plan will be implemented to avoid traffic accidents, jams/public inconvenience. (Refer TMP in the Annex-V)

6.9.2 Resource Conservation

Potential Impact

Resources involved in the construction of proposed Project would include water, fuel and construction materials.

Excessive water consumption by the construction staff may stress water resources in the project area and in certain cases may disturb the existing water supplies in the project area.

Construction material to be used for construction includes coarse aggregates, fine aggregates, asphalt, cement, lining material, earthworks, reinforced and structural steel etc. Almost all the materials to be used in the construction of proposed Project are non-renewable and therefore their efficient use is necessary for the future use.

Fuel will be used to operate construction machinery. Efficient use of energy resources is important to reduce air emissions. For conservation of energy, efficiency of the engines and burning processes is important. The impact is minor negative.

Mitigation Measures

Following practices shall be adopted to conserve these natural resources:

- Use potable water bowsers for construction works and mineral water bottles/ ground water for drinking purpose;
- Plan for the provision/purchase of adequate insulation to reduce heat loss through batching plants;
- Reduction of wastage of water through training of workers involved in water use;
- Reuse of construction waste materials may be adopted wherever possible;
- Diesel and fuels with low sulphur content should be used to operate construction machinery and equipment;
- Efficient and well maintained equipment and machinery should be used;
- The equipment and machinery should be turned off when not in use;
- Ensure adequate insulation to reduce heat loss through batching plants;
- Regularly monitor CO and CO₂ content of the flue gases to verify that combustion systems are using practical excess air volumes;
- Use of solar panels at construction camps may be considered and plan for use of solar panels at operational phase may also be considered; and
- A good camp design and an efficient worksite management plan can help the contractor to reduce the water demand, wastewater and solid waste volumes to the lowest levels



6.9.3 Soil Erosion and Contamination

Potential Impacts

The clearing of vegetation can also loosen the soil and make it more susceptible to erosion due to wind and rain. There is also a possibility of silt runoff during rainy season causing soil erosion. During the rain, the eroded soil mix with stagnant water to transform into mud, which can affect movement of vehicles and machinery and construction work as well as limit the movements of local people. Soil may be affected by erosion, compaction and contamination. Soil erosion may occur on roadside, at contractors' camps and at embankment works, as a result of uncontrolled run-off from equipment washing yards, excavation of earth/cutting operations and clearing of vegetation. Soil may also be impacted due to unauthorized use of borrow areas and quarries, resulting in degradation of landscape. Whereas, contamination of soil may be caused by solid waste generated at campsites and by oil and chemical spills at asphalt plant sites, workshop areas and equipment washing yards. This may limit the productive use of land for future. This impact is high adverse in nature.

Mitigation Measure:

- The Contractors will be required to instruct and train their workforce in the storage handling and management of materials and chemicals that can potentially cause soil contamination;
- Material Safety Data Sheets (MSDS) will be strictly followed during handling and storage of chemicals;
- Soil contamination by asphalt will be minimized by placing all containers in a bunded area away from water courses;
- Provision of impervious platform with oil and grease trap for collection of spillage during equipment and vehicle maintenance;
- All spoils shall be disposed of safely and the site shall be restored back to its original conditions;
- Non-bituminous wastes from construction activities shall be dumped in approved sites, in line with the legal prescriptions for dumpsites;
- In areas with strong sheet flow, high embankments will be provided with chutes and drains/culverts to minimize soil erosion. Stone pitching and retaining walls will be made at high embankments in critical areas;
- As applicable and needed, plantation of grasses and shrubs will be done for slope protection;
- Soil erosion control measures such as the formation of sediment basins, slope drains, etc, shall be adopted;
- Productive land or land adjacent to agricultural / irrigated land may not be preferred for excavation;
- Non-productive, barren lands in broken terrain, nullahs and publicly recognized waste lands should be given preference for borrowing materials;
- Aggregate required for construction procured from quarries and river beds will need approval from authorities;
- Solid waste generated at the camp sites will be properly treated and safely disposed only in the demarcated waste disposal sites/areas;



- If any contaminated soils are found, they shall be removed and deposited in a sealed pit in an area agreed with the concerned;
- Use of modern, well-maintained machinery and vehicles by the contractor to avoid leakages; and
- Soils removed during construction would be stockpiled for reuse where possible;

6.9.4 Excavation of Earth

Potential Impacts

During construction, there is a chance of finding archeological remains. Mismanagement of the archeological remains may result loss of a valuable asset. Further, excavation of earth from borrow areas may result in erosion of soil. Erosion results in change of edaphic characteristics of soil. Loss of fertile top soil may affect adversely on the productivity of the project area. The impact is high adverse in nature.

Mitigation Measures:

- In case of finding archeological remains during excavation, the contractor shall immediately report through SC to Directorate of Archaeology and Museums, Khyber Pakhtunkhwa to take further suitable action to preserve those antiques or sensitive remains. Chance find procedure is given in **Annex-IX**
- Avoid agriculture land for borrow materials; and
- Contractor needs to obtain approval for excavation and submit the plan of rehabilitation of the site after excavation.

6.9.5 Air Quality

Potential Impact

Air quality will be affected by fugitive dust emissions from construction machinery; dust from the unpaved surface and construction vehicles. Emissions may be carried over longer distances depending upon the wind speed, direction, temperature of surrounding air and atmospheric stability. Besides, multifarious construction activities and increased vehicular traffic (construction vehicles) would also contribute to the localized airborne dust. Once in the air, the larger sized particles, under influence of gravity, tend to settle down in the immediate vicinity of the source. The Suspended Particulate Matter (SPM) of the size smaller than 10 micrometer (PM_{10}) tends to remain suspended in the environment for much longer and persistent time and is an environmental hazard. The objectionable impacts of settling of the suspended dust would be its dry deposition on vegetation, motor vehicles, structures, and other exposed surfaces. Exhausts from fossil fuel burning in the construction machinery will also deteriorate local air quality. Similarly, exhausts from generators can also have impacts on air quality in the vicinity.

The overall impact on the quality of air during the construction phase will be high adverse, however, it will be temporary and limited to the project's implementation phase only.

Mitigation Measures



The impacts construction phase of the proposed Project could be effectively mitigated by the implementation of simple procedures by the contractor including but not limited to the following:

- All vehicles, machinery, equipment and generators used during construction activities should be kept in good working condition and be properly tuned and maintained in order to minimize the exhaust emissions;
- Open burning of solid waste from the contractor's camps and at construction site should be strictly banned;
- Preventive measures against dust should be adopted for on-site mixing and unloading operations;
- Construction materials (sand, gravel, and rocks) and spoil materials will be transported through trucks covered with tarpaulins and all vehicles (e.g., trucks, equipment, and other vehicles that support construction works) will comply with the NEQS for carbon emissions and noise;
- Regular water sprinkling of the site should be carried out to suppress excessive dust emission(s);
- Emissions from power generators and construction machinery are important point sources at the construction sites. Proper maintenance and repair is needed to minimize the hazardous emissions;
- Emissions from batching / asphalt plants can be controlled efficiently by the installation of cyclone / scrubbers. Diesel operated equipment should be equipped with well-maintained fuel filter and may be replaced timely (if required). In addition to that, regular maintenance activities comprising changing of lubricating oil, changing the air and fuel filter, cleaning the fuel system, draining the water separators and proper tuning may also help in reducing the emissions from diesel generators;
- Construction equipment is generally left idling while the operators are on break or waiting for the completion of another task. Emissions from idling equipment tend to be high. Existing idling control technologies, which automatically shut the engine off after a preset time can reduce emissions, without intervention of the operators;
- NEQS applicable to gaseous emissions generated by construction vehicles, equipment and machinery should be enforced during construction works;
- Service roads (used for earthmoving equipment and general transport) should be regularly sprayed with water during dry weather;
- All excavation work should be sprinkled with water;
- Construction workers should be provided with masks for protection against the inhalation of dust;
- Vehicles used for construction should be tuned properly and regularly to control emission of exhaust gases;
- Ensure precautions to reduce the level of dust emissions from hot mix plants, crushers and batching plants should be taken up; e.g. providing them as applicable, with protection canvasses and dust extraction units. Mixing equipment should be well sealed and equipped as per existing standards; and
- Regular monitoring of air quality in accordance with NEQS.

6.9.6 Noise and Vibration

Potential Impact



The noise and vibration will be produced due to the operation of construction machinery, equipment and blasting activities. Sources of noise and vibration during construction are heavy machinery such as bulldozers, excavators, stabilizers, concrete mixing plant, pneumatic drills, stone crushers, asphalt plants and other equipment's. Blasting activity will also cause noise/vibration. Noise and vibration are perceived as one of the most undesirable consequences of construction activity. The above machinery is expected to generate noise levels that would be severe in the project area.

The cumulative effects from several machines can be significant and may cause significant nuisances. However, these increased noise levels will prevail only for a short duration during the preconstruction and construction phase.

The likely impacts due to noise and vibration are:

- Psychological effects of distraction of attention, irritation and short temperedness in the exposed persons due to persistently higher noise levels;
- Noisy settings and higher background levels can cause temporary threshold shift;
- Potential impact from vibration during the construction period may affect structure stability of structures in close vicinity; and
- Moreover, vibrations from machinery and equipment such as hand held compactors and concrete vibrators can produce easy fatigability and generalized aches in the persons operating these machines.

Mitigation Measures

- Selection of up-to-date and well-maintained plant or equipment with reduced noise levels ensured by suitable in-built damping techniques or appropriate muffling devices;
- Confining excessively noisy work to normal working hours in the day, as far as possible;
- Providing the construction workers with suitable hearing protection like ear cap, or earmuffs and training them in their use;
- Preferably, restricting construction vehicles movement during night time;
- Heavy machinery like percussion hammers and pneumatic drills shall not be used during the night without prior approval of the client;
- Vehicles and equipment used shall be fitted, as applicable, with silencers and properly maintained;
- Use of low noise machinery, or machinery with noise shielding and absorption;
- Contractors shall comply with submitted work schedule, keeping noisy operations away from sensitive points; implement regular maintenance and repairs; and
- Ensure strict implementation of operation procedures;

6.9.7 Borrow Areas/ Open Pits

Potential Impact

Borrow / open pits and its excavation activities may result in land disputes, soil erosion, and loss of potential cropland, loss of vegetation, landscape degradation, and damage to road



embankments. Borrow/ Open pits may also result in potential sources of mosquito breeding and may prove hazardous to human beings, livestock and wildlife. This will also degrade hygienic condition of the project area. This impact is permanent and high adverse in nature.

Mitigation Measures:

- Necessary permits will be obtained for any borrow pits from the competent authorities;
- Conversion of borrow pits into fish farms and care in selection of borrow areas;
- Necessary permits shall be obtained for any borrow pits from the competent authorities;
- No excavations are allowed within distance of 500 m to ROW;
- In borrow pits, the depth of the pit shall be restricted upto 5' and the sides of the excavation will have a slope not steeper than 1:4;
- Soil erosion along the borrow pit shall be regularly checked to prevent/mitigate impacts on adjacent lands; and
- In case borrow pits fill with water, measures have to be taken to prevent the creation of mosquito-breeding sites.

6.9.8 Construction Camps/Camp Sites

Potential Impacts

Improper construction camp location and mismanagement of construction camp activities can lead to various social and environmental impacts which include health and safety, traffic problems, soil degradation, loss of vegetation and assets on the selected land, solid waste and water pollution. Furthermore, cultural differences, behavior of construction workers, potential disregard for local cultural norms can lead to increased tension between local communities and workers residing in the construction camps. This impact is temporary and moderate negative in nature.

Mitigation Measures:

- The project will seek to avoid sitting camps where their presence might contribute to any conflicts with locals;
- Employment policies which aim to maximize job opportunities for local people will help to minimize tensions caused by different socio-cultural values;
- Camps will be designed to be self-contained to reduce demand on infrastructure and services of nearby communities;
- A comprehensive safety and security plan for the camps will be prepared which will comprise of a training manual, use of safety equipment and emergency preparedness;
- Training will be provided to all staff on camp management rules and overall discipline and cultural awareness;
- Waste Management Plan will be implemented to ensure safe handling, storage, collection and disposal of construction wastes and the training of employees who handle waste;



- Individual trees and shrubs of high conservation value to be marked and preserved wherever possible or transplanted if the root conditions are suitable for such an operation;
- Site for construction camp will be selected to minimize the removal of existing macro-plants at camp sites;
- Photographical and botanical inventory of vegetation before clearing the site;
- Compensatory plantation to be done when construction work near ends; and
- The contractor(s) shall ensure removal & rehabilitation of site upon completion.

6.9.9 Wastewater Generation at Construction Camps

Potential Impact

Wastewater will be generated at the construction camps by the workers. If the generated wastewater is not properly treated or disposed of, this may contaminate the surface water sources such as nullahs, drains, water channels etc. apart from soil contamination. The Table 6.2 below shows anticipated composition and estimate of the wastewater to be generated from construction camp assuming that on average the water demand per person is 40 liters per day and that 80% of the water demand will become wastewater.

Table 6.2: Estimated Wastewater Generated by Workers in Construction Camps

Sr. No.	No. of Workers*	Estimated Total Water Demand** (liters/day)	Estimated Wastewater Generated (liters/day) ***
1	100	4,000	3,200

* "Tentative Work Force Requirements Including Client and Contractor Staff"

** = (100) x (40) = 4,000 liters/day

*** = (4,000) x (80%) = 3,200 liters/day

This impact can be categorized as direct, moderate, site-specific, short term, temporary, high probability and reversible.

Mitigation Measures

To dispose the liquid waste generated from the construction activities, the following steps will be taken by the Contractor:

- Domestic and chemical effluents from the construction camp will be disposed by the development of on-site sanitation systems i.e. septic tanks (as shown in Figure 6.1);
- Proper monitoring to check the compliance of NEQS will be carried out;
- Sewage from construction camps will be disposed of after proper pre-treatment and processes such as soakage pit; and
- The Contractor(s) will be responsible to submit details of site-specific wastewater management plan along with details of wastewater collection, transportation and its disposal.

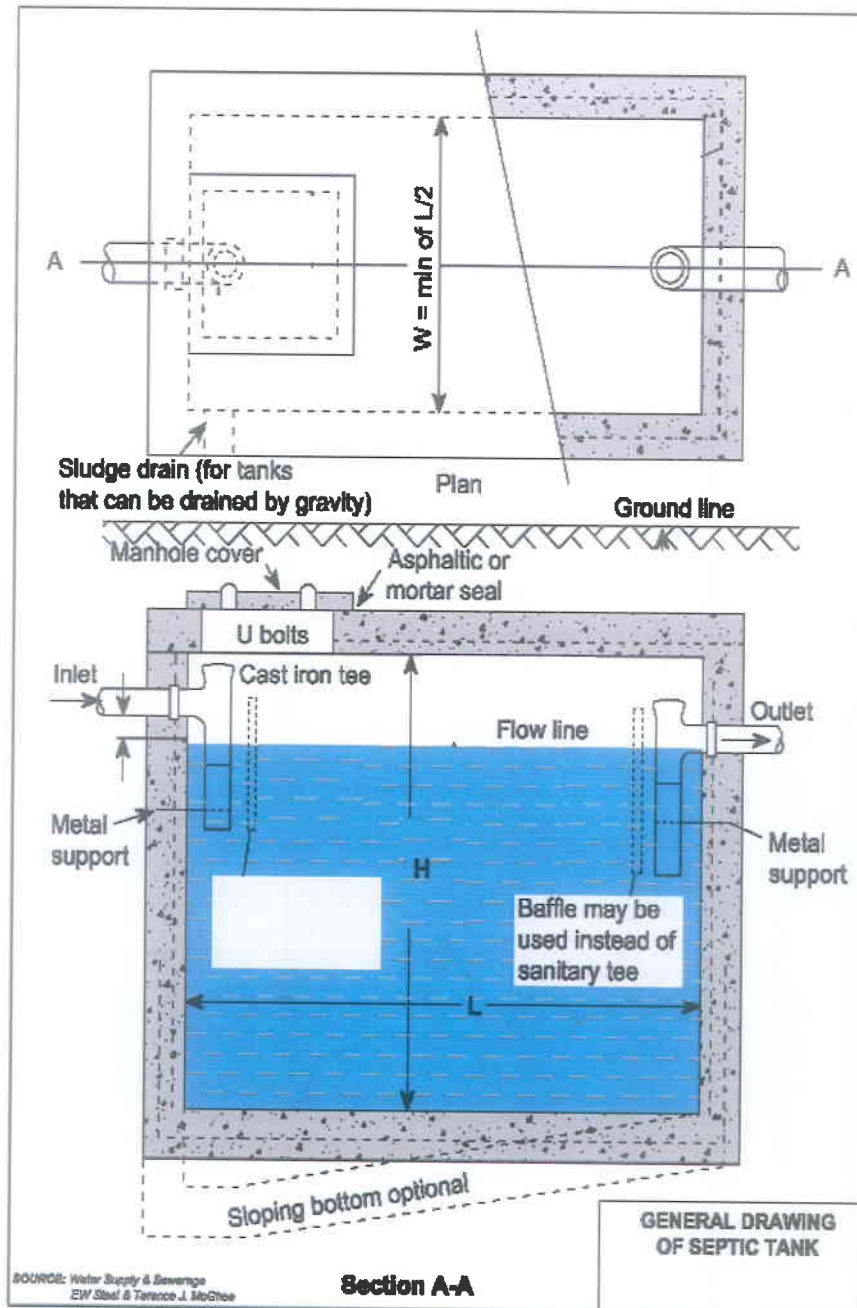


Figure 6.1: General Drawing of Septic Tank

6.9.10 Solid Waste (Construction, Municipal and Hazardous Waste)

Potential Impacts

Considering the labourers (about 100 in numbers) residing in the construction camp and the locally available labour, an average solid waste generation rate of 0.5 kg/capita/day⁹ is

Source: The World Bank Report 2012 – What a Waste: A global review of solid waste management. Based on UNEP estimates for waste generation in the Asia Pacific. Average is 0.45 kg/capita/day.



adopted for the estimation of solid waste generation. Based on this assumption, a total of about 50 kg of solid waste will be generated from construction camps on daily basis.

Different type of waste is likely to be generated during the construction phase of the project. The municipal waste will be in the form of food, cans, paper and wastewater from construction camps toilets and washing yards. Construction waste will include excavated soil, sand, gravel, rocks, asphalt, pieces of concrete, bricks, wood, metal pieces and electrical wires. Whereas, hazardous waste can be comprised of paints and construction chemicals. All these, if left unattended, can become a source of nuisance and environmental pollution in the project area.

Insecure and unhygienic disposal of the solid wastes particularly garbage and trash may cause degradation of soil and land. Insecurely disposed of heaps of wastes containing kitchen garbage and food waste can serve as breeding grounds for the disease spreading vectors and rodents. Throwing away of solid wastes into water channels and the wastewater network can result into choking of the latter.

These impacts are temporary and minor negative in nature.

Mitigation Measures:

- Solid Waste generated during construction and camp sites will be safely disposed in demarcated waste disposal sites and the contractor will provide a proper waste management plan;
- Training of work force in the storage and handling of hazardous materials and chemicals construction workers and supervisory staff should be encouraged and educated to practice waste minimization, reuse and recycling to reduce quantity of the waste;
- Proper labeling of containers, including the identification and quantity of the contents, hazard contact information etc.;
- Waste disposal plan must be reviewed during the entire construction phase in the light of changing weather conditions
- Emergency Response Plan shall be prepared to address the accidental spillage of fuels and hazardous goods;
- Immediate collection of spilled oils/fuels/lubricants by collection of contaminated soils and skipping oils from surface water by applying appropriate technologies;
- Reusing bitumen spillage; and Disposing non-usable bitumen spills in a deep trench providing clay linings at bottom and filled with soil at the top (for at-least 0.5 m);
- Used oil shall be collected in separate containers stored on impervious platform with restricted access and shall be sold to licensed contractor and the burning of waste oil shall be strictly restricted; and
- Segregating and stockpiling scarified/ milled bituminous material and reusing this material in sub grade/shoulders.

6.9.11 Impact on Water Resources (Surface and Groundwater Contamination)

Potential Impact

The proposed Project will traverse through various Nullahs at different locations. These surface water resources may get contaminated by the fuel and chemical spills, or by solid



waste and effluents generated by the kitchens and toilets at the construction camp sites. Moreover, runoff from the chemical storage areas may also contaminate the surface water bodies.

Surface water might get contaminated due to the disposal of construction waste generated due to the Project activity and also result in jeopardizing the health of natives that use this water for meeting domestic requirement. The impact on these water bodies will be only for the period of construction and will vanish as the construction work is over. In addition to that, construction waste, if left unattended will result in forming leachate which will percolate through the soil strata and will reach groundwater and hence, will end up contaminating it.

This impact can be categorized as medium adverse in nature.

Mitigation Measures

As a mandatory step, all the effluents will be disposed as per the requirements of NEQS. Moreover, to reduce the risk of surface and groundwater contamination, good management practices will be adopted to ensure that fuels, chemicals, raw sewage and wastewater effluent are disposed of in a controlled manner. These measures are described below:

- Construction camps will be established in areas with adequate natural drainage channels in order to facilitate the flow of the treated effluents after ensuring that NEQS are met;
- The surface and groundwater reserves will be adequately protected by installing screens and barriers to protect the source of contamination such as construction and oily waste that will degrade its potable quality;
- The proponent will ensure that the construction work is confined within the RoW and water bodies are prevented from pollution during construction;
- The solid waste will be disposed of in designated landfill sites to sustain the water quality for domestic requirements;
- Regular water quality monitoring according to determined sampling schedule;
- The contractor will ensure that construction debris do not find their way into the drainage or irrigation canals which may get clogged;
- Work on irrigation canal areas will be kept to a minimum, protective walls be constructed;
- To maintain the surface water flow/drainage, proper mitigation measures will be taken along the road, like drainage structures in urban areas;
- Prohibit washing of machinery and vehicles in surface waters, provide sealed washing basins and collect wastewater in sedimentation/retention pond;
- Construction work close to the streams or other water bodies will be avoided, especially during monsoon period;
- Wastes will be collected, stored and taken to approve disposal site.
- Wastewater effluent from the Contractors' workshops and equipment washing-yards will be passed through gravel/sand beds to remove oil/grease contaminants before discharging into the natural streams. According to the NEQS, the BOD concentration in sewage must be brought down to less or equal to 80 mg/l before being discharged into a natural stream having capacity to dilute the effluent. For wastewater apart from BOD, COD of 150 mg/l will also be checked; and



- Similarly, if the sewage after treatment is to be discharged on to the land it will meet the requirements of the NEQS for disposal of wastewater.

6.9.12 Waste Management from Asphalt and Batching Plants

Potential Impact

Concrete and asphalt have limited usable life, after which they become waste. If not used within the time span, their wastage will have major financial implications. Further, their disposal will become very difficult because of the large quantities involved. This impact is medium adverse in nature.

Mitigation Measures

- The contractor will develop specific EMPs for asphalt plants and concrete batching plants. These plans will incorporate the general measures as applicable to the entire project, but will also have focused mitigations for solid waste from these plants; and
- The plan will be reviewed and approved by SCs

6.9.13 Green House Gas (GHG) Abatement

Potential Impacts:

The main sources of greenhouse gases (CO₂, CH₄, NO_x etc.) during the construction activities of the proposed Project will include both mobile and stationary sources. The mobile source will be the construction and transportation vehicles while the stationary source will be the batching and asphalt plants. Emission of greenhouse gases cause global warming and other climatic changes on regional and global scale. The climate change due to global warming may result in following impacts over a period of time:

- Extended summer season and absence of snow falls;
- Melting of glaciers resulting in Flash Floods;
- Higher temperatures may result in more precipitation falling as rain rather than snow, hence earlier and greater runoffs, increased runoff may pose greater challenges for water management
- Increased natural hazards such as landslides and debris flows, extreme/unpredictable rainfall events, wind storms, droughts and wildfire.
- Due to shift in temperatures and precipitation patterns runoff, stream/lake temperatures, suitable habitats may move upland, thereby declining in size, ecosystems become fragmented, number and composition of species will change with particular threats to sensitive species; and
- Increased damages to transportation infrastructure from extreme events, causing difficulties for access and emergency evacuation, and involves higher maintenance costs.

Mitigation Measures:

- Regular motioning of the vehicles for engine efficiency;
- Avoid idling of construction vehicles;



- Alternative energy resources shall be considered where possible; and
- NEQS applicable to gaseous emissions generated by construction vehicles, equipment and machinery shall be enforced during construction works.

6.9.14 Discovery of Heritage Sites and Structures during Excavation

Potential Impact

During excavation, there is a chance of finding artifacts. In case of finding any artifact, the contractor shall immediately report through SC to Directorate of Archeology and Museums KP to take further suitable action to preserve those antiques or sensitive remains. This impact is medium adverse in nature.

Mitigation Measures

- PMU-NHA or the Contractor should acquire an approval from the concerned department prior to construction; and
- Follow steps mentioned in a *Chance Find Procedure* (attached as Annex-IX) in the event, if any unknown cultural heritage is found during any excavation activity.

6.9.15 Emergency Response

Potential Impact

The construction of the proposed Project may encounter emergencies. In addition, disasters such as earthquakes and fires may occur. Lack of Emergency Response Plan (ERP) or an inefficient response plan may lead to an accident or critical injury. This impact is medium adverse in nature.

Mitigation Measures

ERP attached as Annex-X should be adopted in case of any emergency.

6.9.16 Disposal of Mucking Material

Inevitable cut and fill earthwork operations will open up scars on the land around the project area. This impact is temporary and minor negative in nature.

Mitigation Measures:

Mitigation measure will include proper landscaping, which should be given due consideration along with re-establishment of the local/indigenous vegetation. The excavated materials that are unsuitable for use will need to be stored, transported and reused and the residual material shall be disposed of appropriately at designated sites.

6.9.17 Natural and Man-Made Disasters



Potential Impact

Natural disasters (earthquakes) and accidents such as fire, falls, slips and trips may result in injuries, financial losses and may even lead to deaths. The workers shall be trained and facilitated to cope with such disasters.

Mitigation Measures

Mitigation measures include the following:

- An Emergency Response Plan (ERP) for earthquakes and manmade disasters should be developed by contractor in coordination with SC and NHA should be implemented in close consultation with the RESCUE Services and other concerned departments;
- Training of the Contractor and NHA staff and employees regarding the emergency procedures and plans should be regularly conducted;
- Emergency numbers should be clearly posted at all disposal stations; and
- Minor incidents and near misses should be reported, and preventive measures should be formulated accordingly by NHA.

6.9.18 Community Health and Safety

Potential Impact

The construction activities and vehicular movement at construction sites may result in roadside accidents particularly inflicting local communities who are not familiar with presence of heavy equipment. Quality of groundwater and surface water resources available in the nearby local communities may be affected due to the construction activities, oil spillage and leakage, roadside accidents, etc. The proposed Project will also have potential of air (dust pollution), noise and vibrational impacts on nearby community. The labour works with different transmittable diseases may cause spread out of those diseases in the local residents. The construction areas located near the residential, settlements, may cause accident for the people moving near to those areas. Conflicts may arise between the local community and the construction workers, which may be related to religious, cultural or ethnic differences, or based on competition for local resources. Tensions may also arise between different groups within the labor force, and pre-existing conflicts in the local community may be exacerbated. Ethnic and regional conflicts may also be aggravated if workers from one group are moving into the territory of the other. Considering these consequences, this impact can be categorized as moderate adverse impact.

Mitigation Measures

- The Contractor will prepare the site specific community health and safety plan. in compliance with Pakistan Labor Laws;
- The Contractor will clearly barricade work areas to prevent access by the public;
- Providing basic medical training to specified work staff and basic medical service and supplies to workers;
- There will be proper control on construction activities and oil spillage leakage of vehicles;



- The labourers with different transmittable diseases will be restricted within the construction site;
- Ensure that the site is restricted for the entry of irrelevant people particularly children;
- Efforts will be made to create awareness about road safety among the drivers operating construction vehicles;
- Timely public notification on planned construction works;
- Close consultation with local communities to identify optimal solutions for diversions to maintain community integrity and social links;
- Seeking cooperation with local educational facilities (school teachers)/religious at each village along the route for road safety campaigns;
- Provision of proper safety and diversion signage, particularly at urban areas and at sensitive/accident-prone spots;
- Setting up speed limits in close consultation with the local stakeholders;
- The mitigation measures provided in the following sub-sections for air and noise shall be adopted to reduce the air pollution, noise pollution and vibrational impacts on nearby community;
- Construction Camp Management Plan (CCMP) and effective implementation of GRM may reduce this impact;
- The Contractor shall ensure the compliance with NEQS;
- The communicable disease of most concern during construction phase, like Sexually-Transmitted Disease (STDs) such as HIV/AIDS, COVID-19 will be prevented by successful initiative typically involving health awareness, education initiatives, training health workers in disease treatment; immunization program and providing health service. Updated / latest guidelines by GoP may be observed to combat with COVID-19 (Annex-VI);
- Reducing the impacts of vector borne diseases will be accomplished through implementation of diverse interventions aimed at eliminating the factors that lead to disease, which include prevention of larval and adult propagation of vectors through sanitary improvements and elimination of breeding habitat close to human settlements and by eliminating any unusable impounding of water;
- Water sprinkling will be carried out to suppress dust;
- Contractor will prepare the Method of treatment and disposal of sanitary wastes, disposal of hazardous waste, actions to be taken in the event of land and water based pollution events and procedures for the collection and disposal of wastes, including domestic and construction waste to protect the local community;
- The Contractor will prepare the CCMP which, in addition to other components, will include the labor influx management plan. This will be reviewed and approved by NHA (where applicable); and
- Contractor will take due care of the local community and observe sanctity of local customs and traditions by his staff. Contractor will warn the staff strictly not to involve in any unethical activities and to obey the local norms and cultural restrictions.

Any environmental condition that is disagreeable to the public and causes an avoidable nuisance can be addressed with additional provisions over and above those described above, as determined necessary by the supervisory consultant.

These requirements will be incorporated into the bidding specification and contract documents, and will be binding on the contractor, at risk of penalty for noncompliance, as charges to be recovered from contractor for unsafe act or condition.



6.9.19 Occupational Health and Safety

Potential Impact

Occupational Health and Safety (H&S) related impacts will arise during construction stage activities including clearing of earth, levelling, compaction, carpeting, pavement finishing and testing & commissioning. The falls during inspection or maintaining pile rigs, steel fixing bridges, erection of framework and other related activities may also occur. Eye injury can be caused by stone or metal particles. Hazard of being hit by falling objects, major hand-arm and whole body vibration hazards, skin and respiratory tract irritation from exposure to cement dust, overexertion and awkward postures etc. will be another impact. Welding hazards include electric shock, fumes and gases, fire and explosions, falls from height, eye and head injuries etc.

Other impacts will be fall from height, contact with heavy electrical and mechanical equipment, equipment failure, uncontrolled movement, unguarded moving mechanical equipment parts, fatigue, unbalanced load, falling objects, hand injury, slip and trip hazards, wind / storm activity, injury from releasing load too soon etc. Operating mechanical and electrical equipment will trigger the H&S issues e.g. struck by moving vehicles or other equipment, slips or trips, struck by flying objects, such as dirt or splashed fluids, caught in pinch points, shear points, crush points, falling from machine etc. The proposed Project area is also sensitive from the law and order point of view and the security as well as the safety of the Contractor and Consultant staff will be a major issue. Considering these consequences, this impact can be categorized as direct, moderate, site-specific, medium term, temporary, medium probability and irreversible.

Mitigation Measures

Following mitigation is given to avoid the accidental risks:

- Occupational health and safety monitoring programs of the contractor (s) should verify the effectiveness of prevention and control strategies;
- Providing basic medical training to specified work staff and basic medical service to workers;
- Contractor will ensure the provision of medicines, first aid kits, ambulance etc. at the camp site;
- Complying with the safety precautions for the construction workers as per International Labour Organization (ILO) Convention No. 62,;
- Training of workers in construction safety procedures, environmental awareness, equipping all construction workers with safety boots, helmets, gloves and protective masks, goggles, shields and monitoring their proper and sustained usage;
- Moreover, proper planning should be done for food storage, setting up of kitchens, production of sewage and waste water may result in multiplication of rodents like rats, mice and shrew etc. and vectors like mosquitoes, bugs and flies which will have a negative impact;
- Work areas will be cordoned off where necessary;
- Ensure the provision of fire prevention and firefighting equipment;



- Contractors will instruct their staff to use PPEs (e.g., wire containment, displaying warning signs along the work site, communicating advance warnings to mats) to enhance the safety; and
- Ensure the provision of emergency prevention, preparedness and response arrangements by the Contractor.

These requirements will be incorporated into the bidding specification and contract documents, and will be binding on the contractor, at risk of penalty for noncompliance, as charges to be recovered from contractor for unsafe act or condition.

6.9.20 Flora

Potential Impact

- The project will involve destruction of vegetation cover on construction areas particularly along proposed road construction. It is initially examined that is approximately **3430 number** of trees/saplings. The provided number of trees is approximate and tentative. The number of possibly impacted trees is provided by GIS mapping, these number shall be authenticated by concerned Forest Department prior to start the activities on ground. Moreover, trees of small and medium sizes will be removed due the layout of the project for which compensation will be made to concerned parties (Local community, forest and other relevant departments.)
- Exhaust of noxious gases from movement of heavy machinery and dust will pollute air which will adversely affect health and vigor of plants. During construction activities the Contractor's workers may damage the vegetation and trees (for use as fire-wood to fulfill the camps requirements).

Mitigation Measures

- Incorporate technical design measures to minimize removal of trees, if possible;
- Cutting of trees and disturbance shall be avoided, as far as possible so, that negative effects on the process of natural regeneration of species are minimized and possible alternate route must be considered for proposed road, in which minimum ecological and environmental losses are expected.
- A tree plantation program shall be formulated with the recommendations and technical support of concerned Forest Department.
- Total **34300** trees shall be planted though forest department.
- As a principal, ten trees shall be planted in place of felling of one tree in consideration of mortality.
- The client shall implement the program with the help of Forest Department and with the consultation of concerned consultant ecologist.
- The Forest Department shall involve the communities for carrying out plantation.



- Plan for compensatory planting for ten (10) trees against each fallen tree of similar floral function at the available spaces in/around the project area.
- Open fires should be banned in the area to avoid hazards of fire in the area.
- Clearing of vegetation cannot be avoided at the areas specified for project structures, but damage to the natural vegetation may be minimized by establishing camp sites, workshops and batching plants on waste/barren land rather than on forested or agriculturally productive land.
- However, if such type of land is not available, it shall be ensured that minimum clearing of the vegetation is carried out and minimum damage is caused to trees and undergrowth.
- Construction vehicles, machinery and equipment will remain confined within their designated areas of movement.
- The Contractor's staff and labor shall be strictly directed not to damage any vegetation such as trees or bushes. They shall use the paths and roads for movement and shall not be allowed to trespass through farmlands or forested areas.
- Contractor shall provide gas cylinders at the camps for cooking purposes and cutting of trees/bushes for fuel shall not be allowed.

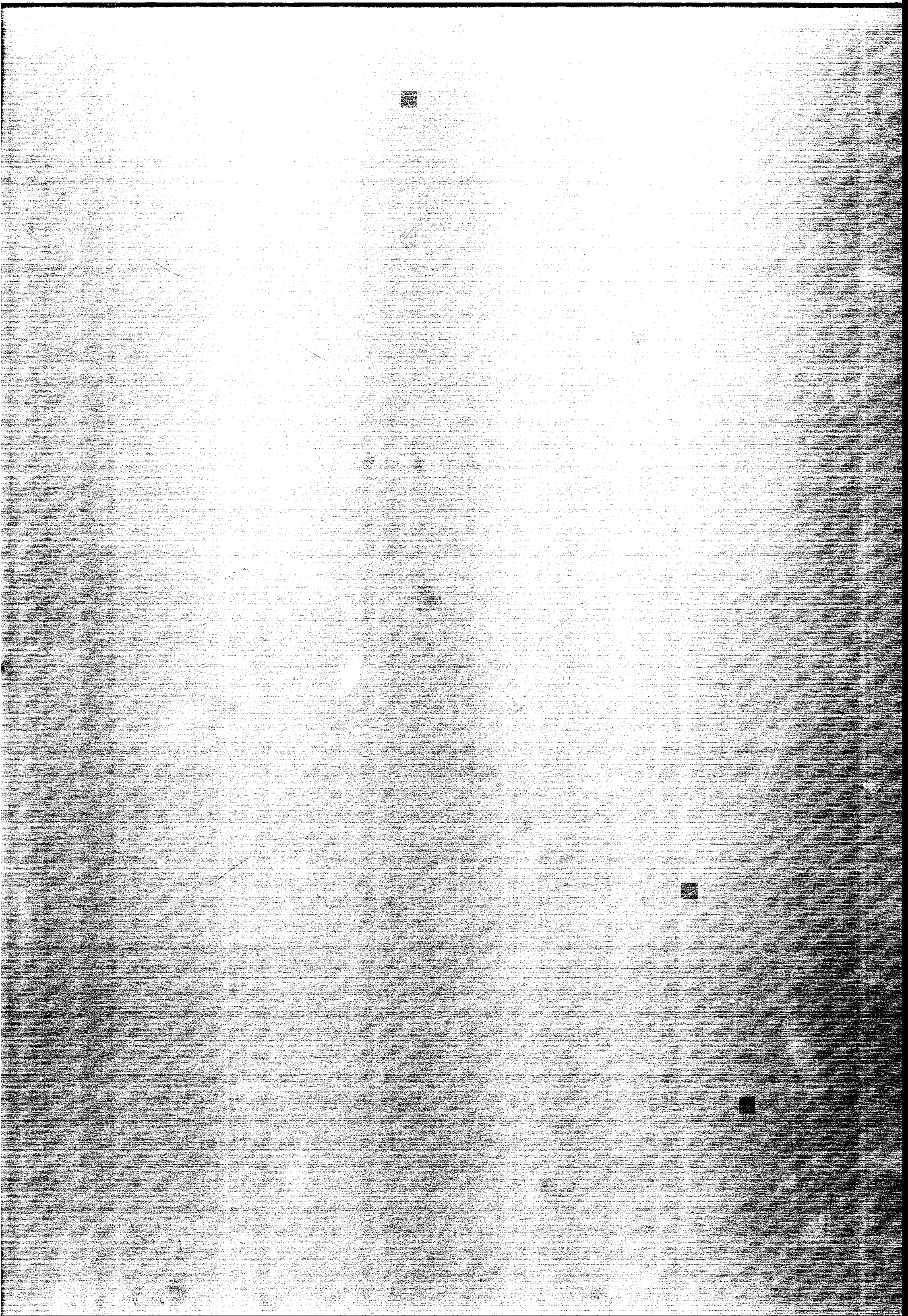
6.9.21 Fauna

Potential Impact

- During construction phase the existing population of mammals and reptiles of the construction areas will be affected due to disturbance arising from construction activities involving excavation, movement of machinery and vehicular traffic, movement of labor, camping, etc. The existing animals will leave the directly affected areas due to construction activities and human intervention. Some animals particularly reptiles may get killed during the earthworks operations. Moreover, the movements of the mammals and reptiles will be restricted during the construction phase.
- Birds as well will tend to move away from the construction areas and find shelter and food elsewhere due to the activities mentioned above for fear of being hunted / trapped.
- Noise generated from machinery particularly during the night hours will even scare the wildlife residing in habitats located at some distance from the construction areas. Uncontrolled blasting may even disturb the wildlife of the Project Areas. Food and refuse at the Contractor's camps may attract animals that might in turn be hunted by the workers. This impact is Indirect, Site-specific, Temporary, Reversible, Possible and Medium Significant.

Mitigation Measures

- Care shall be taken during construction activities for avoiding purposely or chance killing of animals.





- If found any wild species and habitat during constructing that must be dealt carefully and local wildlife department officials should be called.
- Hunting, poaching and harassing of wild animals shall be strictly prohibited, and Contractor shall be required to instruct and supervise its labor force accordingly and clear orders should be given in this regard.
- The Contractor must be held responsible for instructing his work force accordingly and for enforcing this restriction. In addition, this shall have to be controlled by the Wildlife Department.
- NHA must take NOC from the relevant department prior to construction phase;
- Provision of underpass/culvert/tunnel for the movement of different faunal species across the proposed road present in the project area and their locations in consultation with NHA and wildlife department.
- Special measures shall be adopted to minimize impacts on the wild birds, such as avoiding noise generating activities during the critical periods of breeding.
- Blasting (if any) and other noise generating activities shall not be carried out during the night by the work force, clear orders should be given.
- Similarly, wastes of the camps shall be properly disposed of to prevent it being eaten by animals, as it may be hazardous to them.
- Noise produced by construction activities may be kept to acceptable level.

6.9.22 Social and Cultural Conflicts

Potential Impact

During the construction phase of the proposed Project, conflicts may arise between labor force and local community. Use of local resources and products by the construction workers can generate stress on the local resources. Furthermore, difference in cultural values may also cause discomfort to local residents. This impact is negative, local, low, short-term and probable.

Mitigation Measures

- Local labor especially from nearby communities should be given preference for the construction works;
- Careful planning and training of work force to minimize disturbance to the local people;
- Public notification through print or electronic media during the entire construction phase to avoid any inconvenience in accessibility to the locals; and
- Adequate training especially for the transitive workforce of the station (involved both in the construction process and in the commissioning) to regard the customs of the area so that the locals do not feel insecure.

6.9.23 Community Disturbance



Potential Impact

During construction there will be a number of activities which, if not mitigated, are likely to cause disturbance to communities in the Project area; these are:

- Due to the proposed Project, entry/exit problems and bifurcation of settlements, agricultural land/fields may occur for the residents as well as a hindrance in agricultural activities, i.e. hindrance in movement of agricultural machinery and transportation of agricultural products. This will result in causing inconvenience to the residents/farmers and affect their daily activities; also reducing the frequent interactions between families;
- Increased traffic on public routes;
- Health and safety risk will also be posed to the community due to the existence of a construction site(s) and the storage and use of hazardous chemicals; and
- Movement of plant and vehicles throughout the Project area, especially along haulage routes passing alongside private land during disrupting local movement and posing traffic safety issues.

The impacts on community are high adverse in nature.

Mitigation Measures

To mitigate this impact, the provision of subway will be made. Furthermore, it is suggested to install some kind of barriers for crossing the road and to restrict the pedestrians to use the overpasses. Other mitigation measures are:

- Maintaining regular communication with local communities and other stakeholders to minimize tensions arising from Project activities;
- Maintaining a grievance procedure to facilitate stakeholders in expressing concerns;
- Proper traffic diversion plans before the start of the construction;
- Proposal of pedestrian bridge for the locals;
- Appropriate budget for traffic/safety sign boards;
- Timely completion of the proposed Project;
- Maximum the unskilled labor and where possible skilled labor should be arranged locally; and
- Environmental and Social Cell of the Contractor will be responsible for stakeholder engagement and timely information dissemination.

6.9.24 Communicable Diseases

Potential Impact

The laborers in the Contractor Camp, truck drivers and like personnel who interact with each other have the potential for the spread of HIV/AIDS if the incidence exists. Majority of the people living in the surrounding of the Project, and potential Labor are not aware of the source, mode of communication or consequences of HIV/AIDS. Although their religious and cultural value system, to a large extent excludes the outbreak or rapid communication of HIV/AIDS, yet its occurrence in such a situation cannot be precluded. It is necessary that awareness and



preventive campaigns are run from time to time in the Labor camps and the field offices of the Project to prevent the communicable diseases like Cholera, Typhoid and Tuberculosis.

There is a chance of spreading of an epidemic of Coronavirus disease (COVID-19) due to close interaction of the labor force during construction not only among the workers but also in the area. This impact is high adverse in nature.

Mitigation Measures

The Contractor shall:

- Arrange to run an active campaign, in the labour camp, to make people aware of the cause, mode of transmission and consequences of HIV/AIDS;
- Latest / Updated SOPs by national and provincial Government related to the construction industry to control spreading of COVID-19, should be implemented by the contractor and should be strictly monitored;
- Strengthen the existing local health & medical services for the benefit of labour as well as the surrounding villages;
- Ensure cleanliness and hygienic conditions at the labour camp by ensuring proper drainage and suitable disposal of solid waste. Inoculation against Cholera will be arranged at intervals recommended by the Health Department;
- Locating a labour camp at least away from the villages (local settlement), and
- Keep all the camps, offices, material depots, machinery yards and work sites open for the inspection of health and safety measures and related documents.

Guidelines to combat with COVID-19 are attached as **Annex-XI**.

6.9.25 Gender Issues

Potential Impact

Gender-based violence: Construction workers are predominantly younger males. Those who are away from home on the construction job are typically separated from their family and act outside their normal sphere of social control. This can lead to inappropriate and criminal behavior, such as sexual harassment of women and girls, exploitative sexual relations, and illicit sexual relations with minors from the local community. A large influx of male labor may also lead to an increase in human trafficking whereby women and girls are forced into sex work.

Child labor and school dropout: Increased opportunities for the host community to sell goods and services to the incoming workers can lead to child labor to produce and deliver these goods and services, which in turn can lead to enhanced school dropout.

There are two basic conventions on child labor adopted by the ILO, and one adopted by the United Nations. The ILO Minimum Age Convention, 1973 (No. 138) and its accompanying Recommendation (No. 146) set the goal of elimination of child labor, and the basic minimum age for employment or work (in developing countries at 14 years of age or the end of compulsory schooling, whichever is higher; and 15 or the end of compulsory schooling for



developed countries). The Convention sets a minimum age of 2 years younger for "light work," i.e., 12 and 13 years, respectively; and a higher minimum age for dangerous or hazardous work (basically 18 years of age, but 16 in certain circumstances). The Convention also has various other flexibility clauses.

Inhabitants of the project area have mix economic background and different sources of income. Children of low income groups mostly involve in different earning activities, as their parents prefer to get their children hired in small shops as helpers, and waiters in hotels for earning money, and supporting household livelihoods. However, The Khyber Pakhtunkhwa Prohibition of Employment of Child Act, 2015 prohibits the employment of child and restrict the employment of adolescents in certain occupations and processes such as construction industry, and whoever employs or permits a child (person under the age of 15 years) to work in an establishment shall be liable to punishment with imprisonment.

The child labor impact might arise during construction stage, as large number of skilled and unskilled labor will be required by the contractor for the construction activities of the proposed Project. This impact is medium in nature.

Positive Impact

In the proposed Project area there is no possibility of inclusion of females in employment opportunities (labour works) due to cultural and religious norms. However, the proposed Project will have positive impacts on the females of the Project Area due to smooth traffic flow and ease in travelling to hospitals, educational institutions, markets, etc.

Mitigation Measures

- The Contractor will be required to provide qualified key personnel to address the specific risks identified in the project. Contractors will specify key staff with the technical skill and experience to implement the mitigation measures;
- The bidding documents will include specific requirements that minimize the use of expatriate workers and encourage hiring of local workers, thereby minimizing labor influx;
- The bidders will be required to submit Codes of Conduct (CoCs) with their bids. The CoCs will set clear boundaries for acceptable and unacceptable behaviours of all individuals and companies and will be signed by companies, managers and individuals;
- All project consulting firms will also be required to submit Codes of Conduct with their proposals;
- The contractor will be required to establish anti-sexual harassment policies that governs conduct in the workplace;
- The contractor will be required to provide mandatory and repeated training to workers on sexual exploitation and abuse and HIV/AIDS prevention and on the content and obligations derived from the code of conduct; and
- Provisions will be set in contracts for dedicated payments to contractors for SEA prevention activities (e.g. training) against evidence of completion. The portion of the contract price will be guaranteed by a performance security linked to environmental and social contractor performance.



6.9.26 Impacts on Livelihood

Potential Impact

The construction activity may disturb the business and livelihoods of the shopkeepers and workers doing their businesses along the proposed alignment due to the excavation activities. In this respect, the most critical area is Tarujabba and Pabbi bazar

The main commercial activities in these areas include shops, grocery stores, workshops, restaurants, cattle farm, poultry farms and factory. At this stage the assessment of livelihood impacts has been carried out on the basis of the alignment and proposed construction camps. During the construction phase, these locations will be finalized and on that basis the livelihood impacts will be determined more accurately.

Mitigation Measures

- Proper compensation should be provided to all the affectees losing their livelihoods along the route;
- Relevant stakeholders should be engaged to design livelihood restoration measures including affectees of the proposed Project area;
- Initial assessment of compensation should be carried out for the income loss of the affectees based upon the current approximation of the proposed alignment. This assessment should be reviewed and revised on the basis of final route alignment during the construction phase;
- Project Construction should be completed on time; and
- Proper awareness and training should be conducted among the affectees regarding proposed Project benefits, reasons for acquiring lands and compensations to be provided.

6.9.27 Influx of Labor

Potential Impact

For the implementation of proposed Project activities, skilled and unskilled labor is required by the Contractor. Mostly, skilled and unskilled workers have been associated with the Contractor since long which they utilize, where they are required for the projects, and while other workers are hired from the different areas that belong to different cultural backgrounds. Social problems and conflicts that are associated with Labor Influx are as follows:

- Risk of social conflict: Conflicts may arise between the local community and the construction workers, which may be related to religious, cultural or ethnic differences, or based on competition for local resources. Ethnic and regional conflicts may be aggravated if workers from one group are moving into the territory of the other;
- Increased risk of illegitimate behaviour and crime: The influx of workers and service providers into communities may increase the rate of crimes and a perception of insecurity by the local community. Such illegitimate behavior and crimes can include theft, physical assaults, substance abuse, sexual assault and human trafficking;
- Impacts on community dynamics: Depending on the number of incoming workers and their engagement with the host community, the composition of the local



community, and with it the community dynamics, may change significantly. Pre-existing social conflict may intensify as a result of such changes;

- Increased burden on and competition for public service provision: The presence of construction workers and service providers (and in some cases family members of either or both) can generate additional demand for the provision of public services, such as water, electricity, medical services, transport, education and social services. This is particularly the case when the influx of workers is not accommodated by additional and separate supply systems;
- Increased risk of communicable diseases and burden on local health services: The influx of people may bring communicable diseases to the project area, including STDs, or the incoming workers may be exposed to diseases to which they have low resistance. Workers with health concerns relating to substance abuse, mental issues or STDs may not wish to visit the project's medical facility and instead go anonymously to local medical providers, this can result in an additional burden on local health resources;
- Local inflation of prices, accommodations and rents: A significant increase in demand for goods and services due to labor influx may lead to local price hikes and crowding out of community consumers. Depending on project worker income and form of accommodation provided, there may be increased demand for accommodations, which again may lead to price hikes and crowding out of local residents; and
- Increase in traffic and related accidents: Delivery of supplies for construction workers and the transportation of workers can lead to an increase in traffic, rise in accidents, as well as additional burden on the transportation infrastructure.

This impact is negative and temporary in nature.

Mitigation Measures

Suggested mitigation measures for smooth execution of construction activities include:

- Labor camp(s) should be established away from residential population;
- Preference should be given to the local people to work with contractor, and contractor should hire maximum labour force from the project area because this will reduce the labour influx;
- Awareness should be created among the work force to ensure respect for local customs;
- Construction work should be completed within the stipulated time to move workers to next location;
- Labor force should be shuffled with the time;
- An effective GRM should be established for the project to resolve all issues related to the community. Thus, progress regarding resolving the issues should be monitored closely;
- Create awareness among workers on proper sanitation and hygiene practices to endorse proper health and maintain good housekeeping practices at all project sites;
- Provide adequate personal hygiene facilities in good condition with adequate supply of clean water;
- Make arrangements to treat the affected workers on time to control the movement of vector borne diseases;
- Sensitize workers and surrounding communities on awareness and prevention of COVID-19, HIV/AIDS and Sexually Transmitted Infections (STI) through training, awareness campaigns and workshops during community meetings;



- Provide proper and free COVID-19, HIV/AIDS and STI health screening and counseling for site workers and community members;
- Develop and enforce a strict code of conduct for workers to regulate behavior in the local communities;
- Taking all sensible precautions to avert illicit, vicious conduct by or amongst the Contractor's personnel, and to preserve unity and harmony, and protection of people and property on and near the sites;
- Prohibiting drugs, alcohol, weapons, and ammunition on the worksite among personnel;
- Site security preparations must be contained within the Bills of Materials (BoMs) to avoid any delays which might be caused due to insecurity;
- Appropriate fencing, security check points, gates and security guards should be provided at the construction sites to ensure the security of all plant, equipment, machinery and materials, as well as to secure the safety of site staff; and
- The Contractor must guarantee that good relations are maintained with local communities and their leaders to help reduce the risk of vandalism and theft.

6.9.28 Coronavirus Disease (COVID-19)

Potential Impact

COVID-19 may be introduced due to the immigration of workers associated with the proposed subprojects.

Ministry of National Health Services, Regulations and Coordination, GoP has issued guidelines in April, 2020 for Health & Safety of Building and Construction Workers during COVID-19 outbreak. These guidelines are prepared for the workers involved in building and construction work during the current epidemic of COVID-19. These guidelines provide the safety measure to be implemented at the construction site having a dusty environment, continuous flow of different materials and make-shift type of arrangements for storage, food and sanitation calls for implementation. This impact is site specific and medium to high adverse.

Mitigation Measures

- All workers must perform complete sanitization at the site as per national guidelines issued by the GoP¹⁰;
- All workers must wear a mask and gloves as soon as they arrive at site and must keep wearing it at all times while present at the work site and their body temperature must be checked;
- Make alcohol-based hand sanitizer (at least 70%) available for the workers handling deliveries
- At the work site(s), social distancing measures must be strictly implemented and gathering of workers at any location at the work site(s) must be strictly forbidden.
- All workers will be strictly advised to wash their hands as frequently as practicable and not to touch their face during work.
- COVID awareness sign boards must be installed at the camp clinic and at the work site(s);

¹⁰ <https://covid.gov.pk/guideline>



- Contact details of all workers will be kept in a register on site in order to efficiently trace and manage any possible workers that might experience symptoms of COVID-19;
- Prohibition of entry for local community/any unauthorized persons at work sites;
- Proper hygiene practices in the toilets and washrooms will be implemented with proper and adequate use of soaps and disinfectant spray;
- Everyone on the construction site must observe sneezing and coughing etiquettes;
- The lunch breaks and stretch breaks of the workers must be staggered to avoid the clustering of workers;
- Sick worker should immediately inform the focal person of health and safety and must get medical advice from nearby health center; and
- The contractor may ensure the vaccination of all working staff.

Measures for protecting staff and labour from exposure to, and infection with, the COVID-19 depend on the type of work being performed and exposure risk, including potential for interaction with infectious people and contamination of the work environment. Guidelines to combat with COVID-19 are attached as **Annex-XI**.

6.10 ANTICIPATED IMPACTS DURING OPERATIONAL PHASE

The anticipated impacts related to the proposed Project have been studied for the operational phase and discussed hereunder:

6.10.1 Landscape

Potential Impact

During the operation stage, new saplings of different plants and trees would be planted to enhance the aesthetics and compensate the loss of affected trees. This will have a positive impact of permanent nature. The presence of adequate flora at available spaces along the proposed alignment will help in absorbing flue gases, emitting from a large number of vehicles and public transport passing through the project area, which shall help improve the air quality.

Mitigation Measures

The saplings planted in the project area against the trees affected should be properly maintained throughout their growth.

6.10.2 Air Quality

Potential Impact

Improvement in road condition will help reduce traffic related emissions in the short term by allowing a smoother traffic flow. However, in the longer run, increased traffic levels may lead to higher values of emissions. The impact is permanent. It is positive in case of improvement of road conditions; and minor negative, when traffic volume increases.



Mitigation Measures

Following mitigating measures are needed to be suggested:

- NHA with the help of KPEPA may set up system to monitor air quality along project area in accordance with NEQS for a specific period to record the quality of air during the operation phase;
- Setting up to system to monitor air quality along the project area in accordance with acceptable International Standards; Monitoring emissions of vehicle as per NEQS;
- Greenbelt Development: Increasing vegetation in the form of greenbelt is one of the preferred methods to mitigate air pollution. Plants generate oxygen, serve as a sink for pollutants, reduce the dust and reduce the noise pollution too alongside the proposed Project.

6.10.3 Noise and Vibration

Potential Impact

The movement of vehicles and usage of horns will create noise which will be a hazard for the nearby residents/built-up areas. Impact of noise generated from the vehicles moving on the proposed Project will be permanent and moderate adverse in nature.

Mitigation Measures

- Provision of adequate noise barriers at sensitive receptor locations such as hedges and indigenous tree species will reduce the noise. Further Improvement can be made by enforcing the laws and getting the vehicles tested, regularly after a specific time period, by some reputable vehicle testing laboratory and obtaining a certificate. Noise measurements should be carried out at locations with respect to the schedule specified in the Environmental Monitoring Plan (EMP) to ensure the effectiveness of mitigation measures;
- Use of horn should be strictly prohibited in the close proximity of the built-up areas/sensitive receptors;
- Proper signboards should be installed to ensure reduce noise levels in the project area;
- Enforcement and penalties against traffic rules violators; and

6.10.4 Road Safety

Potential Impact

Enhanced vehicular movement and speed in the long run may result in road safety issues like traffic accidents. This impact is permanent but moderately adverse in nature, since the frequency of accidents may be lowered, but their intensity may be quite severe due to enhanced speeds at which vehicles will move. The impact may be considered permanent and high adverse in nature.

Mitigation Measures



Strict enforcement of speed limits, installation of speed guns and channelization of traffic with respect to categories (heavy vehicle traffic and light vehicle traffic), should be ensured for the smooth flow of traffic moving from major road crossings. Enforcement of penalties for the violators will reduce the significance of this impact.

6.10.5 Drainage

Potential Impact

During the operational phase, poor maintenance of the road drainage system, particularly during the monsoon season can cause nuisance to the travelers and public due to flooding in the existing drainage line. In case of chocking of road drainage, the increased surface runoff due to heavy rains will accumulate at the start and end point of the proposed Project and can cause traffic jams. The impact may consider to be moderate adverse in nature.

Mitigation Measures

- The impact can be controlled/reduced by timely and continuous maintenance/cleaning of the drainage system; and
- Placement of sign boards instructing not to dispose of solid waste to avoid chocking of drain around the road alignment.

6.10.6 Road Maintenance Works and Heavy Traffic

Potential Impact

During the operational phase, different maintenance works will be carried out throughout the project life. Laborers or the staff involved in these maintenance works are exposed to health and safety issues. Poor implementation of HSE plans or noncompliance of PPEs can lead to personal injuries and accidents. Moreover, application of poorly maintained equipment's and material can lead to air and noise pollution. The maintenance works can also cause traffic problems to the travellers. Lack of maintenance may also lead to water and soil pollution. This impact is temporary and minor adverse in nature.

Mitigation Measures

Important points to be attended at the operational stage are as follows:

- Implementation of HSE Plans during the maintenance period;
- Strict implementation of personal protective equipment's PPEs;
- Use of high quality equipment and material by the contractor;
- Continuous improvements in the emergency plans;
- Placement of sign boards for traffic diversions and proper implementation of traffic diversion plans;



- Selection of suitable sites for contractor camps and implementation of all the related important protocols for the management of camp activities in order to avoid environmental and HSE issues;
- HSE protocols should be strictly followed and implemented to avoid any incident/accident;
- Understanding and training of staff on O&M Manual;
- Regular maintenance of engineering works;
- Best Management Practices should be used for all the maintenance works;
- Timely completion of all the maintenance works according to the agreed schedule;
- Traffic management plan should be devised and implemented;
- Maintain vegetated areas in adequate cover to meet the intended purpose(s);
- Conservation practices that limit particulate matter emissions should be incorporated into long-term maintenance plans;
- Blowing of pressure Horns by the vehicle will be strictly prohibited; and
- Continued public consultation and feedback on it.

6.10.7 Flora

Potential Impact

During operational phase, the Project will not affect Flora (trees and agricultural crops) or release any significant pressure detrimental to flora. Low level impact is expected at operational phase on Flora due to the O&M activities. This impact is site-specific, temporary, short-term, irreversible, unlikely and low significant.

Mitigation Measures

- The implementation of plantation plan recommended in compensation for cutting of trees should start working during operational phase, to ensure the ecological balance and to avoid any impact on local environment;
- Large scale planting with suitable indigenous fruit and forest trees, shrubs and ornamental plants in the form of Tree Groves, and Linear plantation will be carried out in accordance with the Tree Plantation Plan to improve aesthetic value and offset the effect of removal of vegetation. It will help in absorbing flue gases, emitting from a large number of vehicles and public transport passing through the project area, which shall improve the air quality;
- The saplings planted in the Project Area against the trees affected should be properly maintained throughout their initial growth period in terms of water requirement and necessary nutrients by relevant department;
- Proper check and balance for above activities is highly recommended. Plantations so, raised must be maintained according to the Silvicultural practices which include proper Irrigation, Cleaning, Pruning, thinning at prescribed intensity, Silt clearance and Trench-opening, etc.
- Maintenance and security of the plantation should be done for at-least five years (in consultation with the forest department). Measures such as fencing, watch guards and fire protection should be considered; and
- All activities must be done under the technical supervision of Forest Department.

6.10.8 Fauna



Potential Impacts

There is no protected area, Game reserve, Game sanctuary or national park in the project area so no major impact on Wildlife & Livestock in the area is expected through, noise, vibration and any type of normal activity in the project area, thus will have no effect on productivity.

Mitigation / Enhancement Measures

- Provision for passing reptiles, amphibians and small mammals should be considered by the design, construction supervision team and contractor to implement the activates in a way that the above species (if found by chance) may use the culverts already design for water ways and other purposes. Here no influx of such fauna is expected as the habitat is highly degraded and the road is existing from the decades so, original fauna of the area is vanished and some species have already migrated to safe heavens;
- In proper consultations with Forest and Wildlife departments, plantation of native tree species as recommended in plantation plan should be implemented to conserve the habitat of local fauna, ecosystems and overall biodiversity; and
- The precautionary measures described for future shall also be applicable during operation phase as relevant for the conservation of wildlife species in the Study Area;

6.10.9 Increase in Land Value

The proposed Project is expected to increase the land values, especially in villages where little infrastructure is present land owners will have an opportunity to sell their land on increased prices and start new businesses. This impact will be high positive in nature.

6.10.10 Decrease in Operating Cost of Vehicles

During the operation of the proposed road, lesser wear and tear of the vehicles will occur and it will also result in lesser fuel consumption and decrease in operating cost. This impact is high positive in nature.

6.10.11 Economic Boost

Improved infrastructure will promote new business opportunities in Project region. In addition, the local community will be benefited with economic boost, better employment, education & healthcare facility especially for women and children will be improved. This impact will be high positive in nature.

6.10.12 Community Development

Improved communication infrastructure will promote new business opportunities. Due to the construction of the proposed Project, access mobility to other area will become easy. New marketing activities will boost with the development of road. With the boost of commercial activity and enhanced employment opportunities and standard of living of the local people will be raise. This impact will be high positive in nature.



7 ENVIRONMENTAL MANAGEMENT PLAN

7.1 GENERAL

EMP is a tool for the implementation of the all the suggested measures to make the project environmentally sustainable. It provides an overall approach for managing and monitoring the environmental, ecological and socio-economic issues of the proposed Project, and describes the institutional framework and reporting mechanism to implement EMP for the Project.

7.2 EMP COMPONENTS

The EMP comprises following main components:

- EMP Objectives;
- Scope of the EMP;
- Environmental Policy, Legislation and Framework;
- Institutional Requirements;
- EMMM;
- Environmental Monitoring Plan;
- Planning for EMP Implementation;
- Training and Capacity Building;
- Communication & Documentation;
- Management Plans;
- Chance Find Procedure;
- Public Disclosure;
- EMP Cost; and
- Summary of Environmental Cost.

7.3 EMP OBJECTIVES

The main objectives of the EMP are:

- Provide project impacts along with the proposed mitigation measures, and a corresponding implementation phase;
- To ensure that all necessary corrective actions are carried out in time to counter any adverse environmental impact;
- To ensure the regular monitoring of those factors which may affect the safety of the environment under a systematic monitoring approach;
- Define the roles and responsibilities of the Project Proponent and Contractor in order to effectively communicate environmental issues among them;
- Provide a procedure for timely action in the face of unanticipated environmental situation;
- Identify training requirements at various levels including Project Proponent, Contractor and SC;
- Provide a monitoring mechanism in the form of an environmental monitoring program, which includes monitoring parameters, monitoring frequency to ensure that all the mitigation measures are completely and effectively implemented;
- Provides estimation of environmental cost for the implementation of EMP;



- Define the requirements necessary for documenting compliance with EMP and communicating it to all the concerned regulatory agencies; and
- Provide other plans considering the project specific requirements.

7.4 SCOPE OF THE EMP

The scope of the EMP includes the following phases of the proposed Project:

- Pre-construction Phase;
- Construction Phase; and
- O&M Phase.

All the activities performed during these phases will be controlled and monitored according to this EMP.

7.5 ENVIRONMENTAL POLICY, LEGISLATION AND FRAMEWORK

The applicable policies, legislation, acts and guidelines are discussed in detail in Chapter 2 of EIA.

7.6 INSTITUTIONAL REQUIREMENTS

The institutional requirements for the construction and Operation & Maintenance (O&M) phases of the proposed Project are provided in below sections.

7.6.1 Institutional Arrangements for Implementation of EMP during Construction Phase

The key players involved during construction phase of the proposed Project are the PMU NHA as employer/proponent, KPEPA, the Supervisory Consultant (SC) and the Contractor. The roles and responsibilities of these organizations are outlined below.

The following staff will be involved in the implementation of EMP:

- PMU-NHA/Proponent/Employer;
- SC's; and
- Contractor's Environmental Manager.

The employer/ proponent (NHA) will make Contractor bond through contract documents to implement the EIA including EMP and other terms and conditions of the Environmental Permit. The whole EMP will be included as a clause of the contract documents. Construction camps will be established after necessary approvals and submission of Site-Specific EMPs to be developed in the light of the relevant agencies requirements, before commencement of new works. The organizational setup for implementation of EMP during construction phase is provided in **Figure 7.1**.

7.6.2 Overall Oversight Arrangements

A Project Steering Committee comprising of Chairman NHA, PD (Chamkani-Nowshera N-5 road project) and Deputy Director, NHA will provide overall guidance and oversight and will be responsible for ensuring effective implementation of the project.

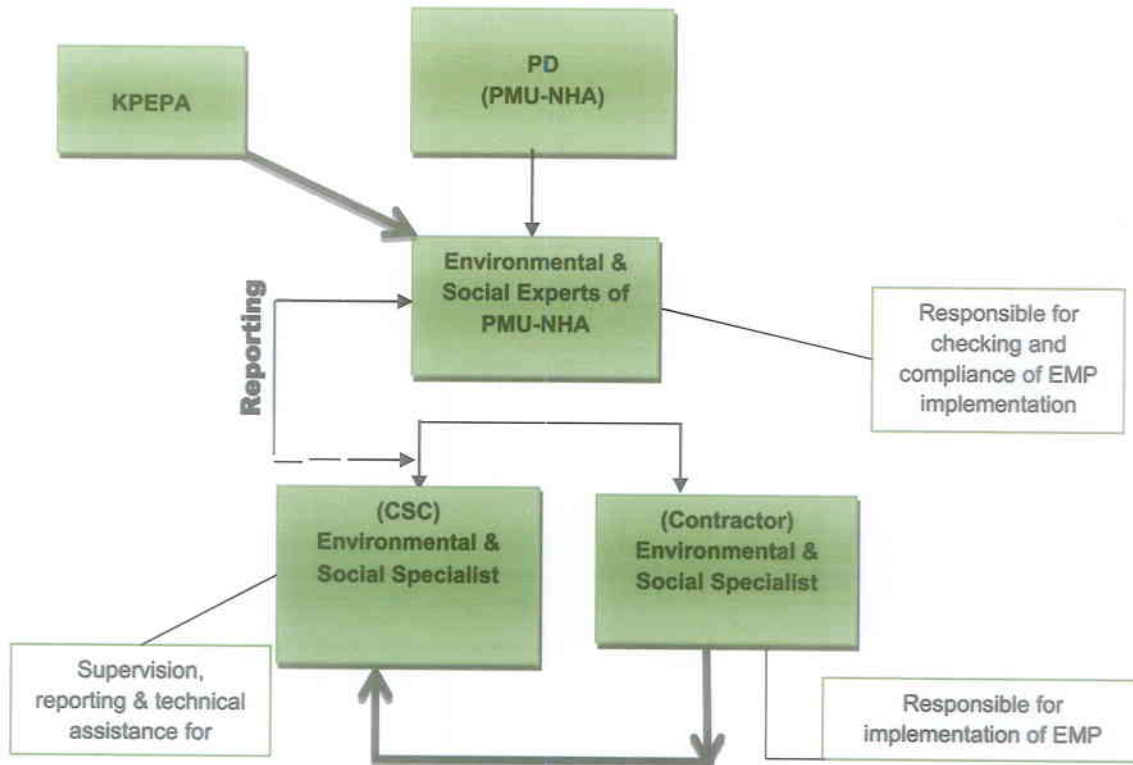


Figure 7.1: Organizational Setup for Implementation of EMP at Construction Phase

7.6.3 Roles and Responsibilities

a) KPEPA

As per Khyber Pakhtunkhwa Environmental Protection Act 2014 KPEPA is responsible for environmental protection and pollution control. The KP EPA is responsible for the approval of the EIA and IEE of all the developmental projects under their jurisdictions. KPEPA will undertake audits (as and when required) of the proposed Project activities with respect to the protocols as defined in EMP.



b) Employer Concerned Staff (PMU-NHA)

PD, NHA is directly in-charge for the financial and technical matters assisted by Environment and Social staff for the compliance of EIA including EMP. The general monitoring responsibilities will consist of:

- Ensuring that the required environmental training is provided to the concerned staff;
- To carrying out random site visits to the construction sites to review the environmental performance of the Contractor;
- Review monitoring reports for the progress of environment related activities;
- Make sure that the Contractor is implementing the additional measures suggested by the SC in environmental monitoring reports;
- Assessment of the crops, orchards, valuation of property (if any), public utilities and negotiation with the affectees for fixation of compensation to be paid for temporary as well as permanent acquisition of the land;
- To estimate the crop compensation;
- Assist in checking genuine ownerships of the claimants, in consultation with the Revenue staff for prompt payment to the affectees;
- To ensure that the tenants get their rightful compensation as per prevailing law especially in case of loss of crops;
- Assist the Contractor for the timely payments of negotiated prices;
- To assist Contractor for obtaining necessary approvals from the concerned departments;
- Maintaining interface with the other lined departments/stakeholders; and
- Reporting to the KPEPA on status of EMP implementation.

c) Supervisory Consultant (SC)

A professional consulting firm will be hired by PMU-NHA and responsible for Contract Administration and Construction Supervision. The firm will be fully empowered as the 'Engineer'. The Consultant will administer the civil work's contracts, make engineering decisions, be responsible for quality assurance, provide general guidance and furnish timely responses to the Contractors in all matters relating to the civil works, and ensure that all clauses of the Contract Agreement including environmental and social clauses between the civil works Contractors' and PMU-NHA are respected. The Project Engineer will have a full-time field based environmental and social specialist to ensure the implementation of EIA including EMP. Two separate experts, one for environment and one for social aspects, will be hired. The environmental and social specialist of SC will also develop training modules, conduct environmental and social trainings for the contractor's staff, and ensure social issues are properly addressed and mitigated during the project life.

Roles and responsibilities of SC will be:

- To oversee the performance of the Contractor to make sure that the Contractor is complying with EMP;
- Ensuring that the day-to-day construction activities are carried out in an environmentally and socially sound and sustainable manner;
- Strong coordination with the Contractor and PMU-NHA;
- Preparing training materials and implementing programs;



- Ensure the implementation of the mitigation measures suggested in EMP;
- To supervise and monitor environmental activities being performed at site;
- To organize periodic environmental training programs and workshops for the consultant's and contractor's staff;
- Periodic reporting as mentioned in EMP; and
- Suggest any additional mitigation measures (if required).

d) Construction Contractor (CC)

The Contractor (s) will be responsible for the implementation of EIA including EMP at site. A full-time field based environmental and social expert, whose responsibility will be to ensure compliance, monitor and report all the EIA including EMP implementation related activities on a regular basis. All mitigation measures for adverse impacts proposed in the EIA including EMP will be duly and timely implemented in letter and spirit. For this purpose, daily, monthly and annual checklists will be formulated and maintained.

Contractor (s) will be bond to appoint site based environmental and social experts with relevant educational background and experience for each construction camp. Contractors' environmental and social experts will carry out following activities:

- Implementation of the mitigation measures at construction site;
- Contractor will be bond through contract to take actions against all the special and general provisions of the contract document;
- Contractor will make sure the compliance of EIA including EMP recommendations and will also be responsible for effective liaison with local heads of villages;
- Provision of proper Personal Protective Equipment (PPEs) to the workers and train them for their proper use;
- To conduct the environmental and health & safety trainings to the workers/labour; and
- Coordinate with Environmental Specialist of SC.

7.6.4 Monitoring and Evaluation Consultant

An independent external monitor will be hired to monitor and provide external monitoring reports of the EMP implementation. M&E consultant will report directly to proponent.

7.6.5 Institutional Arrangement for Implementation of EMP during O&M Phase

The proposed Project will be administrated by PMU-NHA during the O&M phase. The PD and his staff (designated Environment and Social Expert) will be responsible for the following:

- Coordinating with the operational staff working under the Regional General Manager to monitor environmental compliance during operation;
- Advising on, and monitoring tree plantations along the road;
- Reporting on the progress of environmental compliance to the KP EPA;
- Assessing the long-term environmental impacts of operation;
- Sustaining a working partnership among the PMU-NHA, KPEPA, Irrigation, Forest and Wildlife departments; and
- Reporting to PD of PMU-NHA about progress of the work.



7.7 ENVIRONMENTAL MITIGATION AND MANAGEMENT MATRIX

EMMM is considered as one of the main elements of EMP. It will be used as the management tool for the implementation of mitigation measures. The plan includes following:

- The envisaged impacts as identified in EIA and their recommended mitigation measures; and
- The person/organization directly responsible for adhering to or executing the required mitigation measures.

It is highlighted that although the responsibilities for executing and monitoring the mitigation measures have been delegated to different organizations, PMU-NHA will hold the primary responsibility for ensuring the full implementation of EMP. **Table 7.1** provides information about all impacts to be raised due to project activities during different phases of the Project i.e. pre-construction, construction and O&M (for details refer Chapter 7: Anticipated Environmental Impacts and Mitigation Measures of EIA Report).

The Contractor(s) will be responsible for the preparation of Site Specific EMP (SSEMP) on the same format of this EMP along with the site specific plans based on the guidelines provided in this Chapter.

Table 7.1: Environmental Mitigation and Management Matrix

Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Indicators	Responsibility	
				Implementation	Monitoring
Preconstruction / Design Phase					
1	<p>Technical Design and Layout Planning</p> <p>Incompatible layout plan and engineering design of the project's structures can undermine the overall aesthetic beauty and ambience of the Project area.</p> <p>Low utilization of the available spaces and designing the structures without considering the prospective and futuristic needs can result in structures with low social acceptability and functionality. This future traffic factor if not considered in the design properly, will also affect the design of the project road and public safety</p>	<p>The technical design of the proposed Project must consider the key factors for the final design and should meet all the local and international standards.</p> <p>Mitigation mentioned in Section 6.8.1 shall be followed.</p>	<p>Confirmation of design incorporation. Audits and Checks</p>	<p>Design Consultant</p>	<p>Proponent</p>
2	<p>Drainage</p> <p>Improper storm water drainage design of the proposed Project may result in stagnant water due to which following impacts are expected to arise</p> <p>Deterioration of road surface and reduction of its bearing capacity; inconvenience for commuters/pedestrians;</p>	<p>Mitigation measures will include provision of appropriate drainage structures with appropriate design capacity to avoid flooding especially during the rains.</p> <p>Proper slopes shall be incorporated in design to avoid the stagnant water on At-grade road surface.</p> <p>Mitigation mentioned in Section 6.8.3 shall be followed.</p>	<p>Confirmation of design incorporation.</p>	<p>Design Consultant</p>	<p>Proponent</p>

Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Indicators	Responsibility	
				Implementation	Monitoring
3	<p>Stagnant water may provide the breeding ground for disease vector; and Foul odour may be generated.</p> <p>Seismicity</p> <p>The proposed Project Area falls in the seismic zone classified as "Zone-2B" with g-value 0.16 to 0.24, and is considered as Moderate Hazard seismicity zone.</p>	<p>The proposed structure should be designed and constructed keeping in consideration high intensity earthquakes.</p> <p>Seismic Building Code of Pakistan 2007 (SBC-07) should be adopted.</p> <p>Mitigation mentioned in Section 6.8.4 shall be followed.</p>	<p>Confirmation of design incorporation.</p>	<p>Design Consultant</p>	<p>Proponent</p>
4	<p>Change in Hydrologic Regime</p> <p>The proposed road comprised of around eighteen (18) bridges which passes through number of storm drains and nullahs. Due to the widening, it might cause a change in water flow pattern and disturbance to water flow that will lead to create an impact on downstream of these drains and nullahs.</p>	<p>Bridges shall be properly designed to accommodate design flows.</p> <p>Mitigation mentioned in Section 6.8.6 shall be followed.</p>	<p>Confirmation of design incorporation. Audits and Checks</p>	<p>CC, Design Consultant</p>	<p>Proponent</p>
5	<p>Flora</p> <p>During the pre-construction phase, activities such as installation of construction camps, construction of temporary roads & mobility of construction staff may damage the local vegetation/trees.</p>	<p>The camps, mobility of machinery and construction of temporary road should be proper planned and well designed to avoid any loss to local green cover</p> <p>The alternate routes for roads and points for camps are recommended where no loss of vegetation is expected</p> <p>The location of construction camp should be selected so, as to have</p>	<p>Confirmation of design incorporation Checks and audits of suitable place Tree compensation record</p>	<p>CC, Design Consultant</p>	<p>Proponent</p>



Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Indicators	Responsibility	
				Implementation	Monitoring
6	<p>As the heavy machinery and camps will be moved and installed, which require significant space due to which available vegetation is expected to be removed.</p> <p>Fauna</p> <p>As movement and installations of machinery and vehicles will take place so, noise and habitat loss is expected. The routes of the available wildlife and other habitats may be affected due to camps set-up and machinery movements and installations. Temporary road may also affect the habitat of locally available fauna.</p>	<p>limited environmental impact during construction phase and to reduce the cost and land requirement</p> <p>Mitigation mentioned in Section 6.8.7 shall be followed.</p> <p>The standard measures must be adopted to minimize noise due to machinery movements and installations;</p> <p>Wildlife movements and routes must be considered during activities and should be avoided to their maximum level;</p> <p>The alternate routes and points are recommended to avoid any damage to locally available fauna;</p> <p>The camps shall be properly fenced and gated to check the entry of animals in search of eatable goods;</p> <p>Wastes of the camps shall be properly disposed of to prevent it being eaten by animals, as it may be hazardous to them.</p> <p>Wild boar should be also managed to avoid any inconvenience.</p> <p>Mitigation mentioned in Section 6.8.8 shall be followed.</p>	<p>Confirmation of design incorporation</p> <p>Checks and audits of suitable place</p>	<p>CC, Design Consultant</p>	<p>Proponent</p>
7	<p>Land Acquisition and Resettlement</p> <p>The RoW for the proposed Project is already available and owned by NHA, therefore, no land acquisition will be involved for the proposed</p>	<p>• No mitigation measures required.</p>	<p>Compensation and land records</p> <p>Confirmation of design incorporation</p>	<p>CC, Design Consultant</p>	<p>Proponent</p>



Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Indicators	Responsibility	
				Implementation	Monitoring
	Project. Furthermore, there may be issues in the clearance of proposed RoW.				
8	<p>Renting/Leasing Land</p> <p>The development of Contractor camps and facilities i.e. storage, workshops, equipment parking and washing areas; aggregate quarries; and access roads/tracks for haulage, transportation etc. will required renting/leasing land.</p> <p>The approximate area required for the establishment of one Contractor's camp facilities will be 1500m² at the different locations.</p> <p>Physical, Religious and Cultural Resources</p> <p>According to the field survey, various mosques, graveyards, schools and hospitals are coming under the Corridor of Impact. All these structures fall in RoW will be directly affected and demolishing of these structures may cause serious social issues.</p>	<p>Land for above mentioned facilities will be directly rented from the private landowners by the Contractors. Rental terms should be negotiated to the satisfaction of the concerned landowners and the agreement should be in local language to make the process clear.</p> <p>Mitigation mentioned in Section 6.8.9 shall be followed.</p>	<p>Compensation and land lease records</p>	<p>CC</p>	<p>Proponent</p>
9		<p>Due consideration shall be given to minimize the adverse impacts on the religious and community structures and places. The effort will be made by making changes in design (where possible) to avoid the sensitive and religious structures and to minimize the issues at possible extendIn case of demolishing and shifting of graveyards, a mechanism will be developed with the community consultation and proper consultations and coordination's with locals will be carried out to resolve this sensitive issue.</p>	<p>Confirmation of design incorporation. Audits and Checks</p>	<p>CC, Design Consultant</p>	<p>Proponent</p>

Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Indicators	Responsibility	
				Implementation	Monitoring
Construction Phase					
1	<p>Site Accessibility During Construction</p> <p>The proposed Project can be approachable through major roads such as Inqalab Road, Nehar Road, Charat Road, Kaka Sahib Nokahar Road and Motorway M-1. Apart from above existing road, few accessibility tracks needs be developed which may cause damage to trees and crops, soil erosion, soil contamination, air and noise problems.</p>	<p>Mitigation mentioned in Section 6.8.10 shall be followed.</p> <p>Selection of access roads/tracks should be based upon certain criteria to ensure high stability, no or minimum tree cutting and crop damage, minimum disturbance to nearby settlements and other social amenities. The approach roads should be selected to avoid any soil degradation and erosion impacts.</p> <p>Mitigation mentioned in Section 6.9.1 will be followed.</p>	<p>Regular observation and photographic record of transportation route, Road/track repair records, Compensation records for damages of crop, trees and other infrastructure (if happens)</p>	CC	Proponent
2	<p>Traffic Issues</p> <p>Due to the proposed construction activities and movement of heavy project vehicles for construction material supply; traffic problems may arise for the commuters and transporters travelling to the proposed areas. The movement of vehicles along the haulage routes will cause soil erosion, debris flow, dust emissions etc.</p>	<p>Movement of vehicles carrying construction materials and equipment/machinery will be restricted during the daytime</p> <p>Traffic Management Plan will be implemented to avoid traffic accidents, jams/public inconvenience.</p> <p>Mitigation mentioned in Section 6.9.2 shall be followed</p>	<p>Vehicle maintenance record Training record Implementation of TMP Regular visual observations</p>	CC	Proponent
3	<p>Resource Conservation</p> <p>Resources involved in the construction of proposed Project would include water, fuel and</p>	<p>A good camp design and an efficient worksite management plan can help the contractor to reduce the water demand, wastewater and solid waste volumes to the lowest levels.</p>	<p>Work site management plan Resource conservation plan and its implementation.</p>	CC	Proponent



Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Indicators	Responsibility	
				Implementation	Monitoring
	<p>construction materials. Excessive consumption of these resources by the construction staff may stress the resources in the project area and in certain cases may disturb the existing supplies.</p>	<p>Use potable water bowzers for construction works and mineral water bottles/ ground water for drinking purpose. Reuse of construction waste materials may be adopted wherever possible. Efficient and well maintained equipment and machinery should be used.</p> <p>Mitigation mentioned in Section 6.9.3 shall be followed.</p>	<p>Regular visual observations</p>		
4	<p>Community Health and Safety</p> <p>Community health and safety issues during the widening of Chamkani to Nowshera section of N-5 road may include dust, noise, and vibration from construction and vibration from construction vehicle transit, and communicable disease associated with the influx of temporary construction labor.</p> <p>The proposed Project will also have potential of air (dust pollution), noise and vibrational impacts on nearby community. The labor works with different transmittable diseases like HIV/AIDS and COVID-19 etc. may cause spread out of those diseases in the local residents of above mentioned settlements along the proposed Project.</p>	<p>The World Bank/IFC EHS Guidelines, 2007, defines community health and safety in terms that guarantee as-built infrastructure conforms to acceptable standards (structural safety, flood and fire risk), water supply sources are of suitable potable quality, emergency response planning is in place for built environments, traffic safety provisions are enforced alongside transport hazard assessment and mitigation, and disease prevention measures are taken. The Contractor will prepare the site specific community health and safety plan in compliance with relevant sections of the IFC General Environmental Health and Safety Guidelines (WB/IFC 2007), Pakistan Labor Laws,</p> <p>Mitigation mentioned in Section 6.9.17 shall be followed.</p>	<p>Implementation of HSE Plan Use of PPEs Community concerns record Medical reports of worker</p>	CC	Proponent

Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Indicators	Responsibility	
				Implementation	Monitoring
5	<p>The construction areas located near the settlements, may cause accident for the people moving near to these areas.</p> <p>Occupational Health and Safety</p> <p>Occurrence of accidents / incidents and other natural emergencies during the construction stage is a common phenomenon and workers as well as locals will be more prone to serious accidents.</p> <p>Other physical hazards are exposure to weather elements, noise, work in confined spaces, trenching, contact with overhead power lines, falls from machinery or structures, and risk of falling objects).</p>	<p>Safety precautions for the construction workers, Training of workers in construction safety procedures and use of Personnel Protective Equipment (PPE) will mitigate this impact.</p> <p>Mitigations mentioned in section 6.9.18 will be adopted.</p>	<p>Implementation of OHS Plan Use of PPEs Training Records Work permits Implementation of Emergency response plan and disaster management plan in case of natural disaster occurrence</p>	CC	Proponent
6	<p>Soil Erosion and contamination</p> <p>Construction activities such as clearing of earth, levelling, piling, compaction, carpeting, pavement finishing will affect the existing soil condition in the RoW. The clearing of vegetation can also loosen the soil and make it more susceptible to erosion due to wind and rain. There is also a possibility of silt runoff during rainy season causing soil erosion.</p>	<p>Good engineering practices will help to control or minimize the soil erosion both at the construction sites and in peripheral areas. All the disturbed areas need to be protected against soil erosion by stripping and stockpiling of all the available topsoil for later re-vegetation. Special slope protection measures will be adopted in the sensitive areas and along the shoulders of roads. Site restoration plan for the project will be strictly followed.</p>	<p>Visual observation and photographic record Waste Management plan implementation</p>	CC	Proponent

Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Indicators	Responsibility	
				Implementation	Monitoring
7	<p>Soil erosion may also occur in the workshop areas as a result of improper drainage system of equipment washing-yards and improper management of construction activities.</p> <p>Land may also be contaminated due to the spillage of chemicals, fuels, solvents, oils, paints, concrete, solid waste generated at campsites etc.</p> <p>The possible contamination of soil by oils and chemicals at camp sites, workshop area and equipment washing-yards may limit the future use of land for agricultural purposes.</p> <p>Borrow Pits</p> <p>Borrow/ open pits and its excavation activities may result in land disputes, soil erosion, loss of potential cropland, loss of vegetation, landscape degradation, and damage to road embankments.</p> <p>Borrow/ Open pits may also become potential sources of mosquito breeding and may prove hazardous to human beings, livestock and wildlife. This will also degrade hygienic condition of the Project Area.</p>	<p>The Contractors will be required to instruct and train their workforce in the storage handling and management of materials and chemicals that can potentially cause soil contamination. Material Safety Data Sheets (MSDS) will be strictly followed during handling and storage of chemicals.</p> <p>Soil contamination due to concrete transportation and solid waste will be minimized by placing all containers in casings</p> <p>Mitigations mentioned in section 6.9.4 shall be adopted.</p> <p>Necessary permits will be obtained for any borrow pits from the competent authorities;</p> <p>In borrow pits, the depth of the pits will be regulated so that the sides of the excavation will have a slope not steeper than 1: 4;</p> <p>Soil erosion along the borrow pit will be regularly checked to prevent/ mitigate impacts on adjacent lands;</p> <p>In case borrow pits are filled with water, measures have to be taken to prevent the creation of mosquito-breeding sites; and</p> <p>Mitigations mentioned in section 6.9.10 shall be adopted.</p>	<p>Visual observation and photographic record</p> <p>NOC record of permits</p> <p>Check and audits</p>	CC	Proponent



NHA

Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Indicators	Responsibility	
				Implementation	Monitoring
8	<p>Construction Camps/Camp Sites</p> <p>Improper construction camp location and mismanagement of construction camp activities can lead to various social and environmental impacts which include health and safety, traffic problems, soil degradation, loss of vegetation and assets on the selected land, solid waste and water pollution</p>	<p>The contractor(s) should provide plan to NHA for removal & rehabilitation of site upon completion.</p> <p>Photographical and botanical inventory of vegetation before clearing the site.</p> <p>Compensatory plantation to be scheduled when construction works near end.</p> <p>Mitigations mentioned in section 6.9. shall be adopted.</p>	<p>Visual observation and photographic record</p> <p>sanitation plan for the construction camp implementation</p>	CC	Proponent
9	<p>Wastewater Generation at Construction Camps</p> <p>Wastewater will be generated at the construction camps. Based on the 100 workers, 3200 liters/day wastewater will be generated from camps during the construction phase which may affect water bodies if disposed off without proper treatment.</p>	<p>To dispose the liquid waste generated from the construction activities, the following steps will be taken by the Contractor:</p> <p>Domestic and chemical effluents from the construction camp will be disposed by the development of on-site sanitation systems i.e. septic tanks.</p> <p>Proper monitoring to check the compliance of NEQS will be carried out.</p> <p>The Contractor(s) will be responsible to submit details of site-specific wastewater management plan along with details of wastewater collection, transportation and its disposal.</p> <p>Mitigations mentioned in section 6.9.12 shall be adopted.</p>	<p>Visual observation</p> <p>Regular environmental monitoring, sampling and testing reports</p> <p>Waste Management plan implementation</p>	CC	Proponent
10	<p>Solid Waste Generation at Construction Camps</p>	<p>All the solid waste from the camps will be properly collected at source by placing containers and disposed of</p>	<p>Visual observation and photographic record.</p>	CC	Proponent



Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Indicators	Responsibility	
				Implementation	Monitoring
11	<p>Considering the labourers (about 100 in numbers) residing in the construction camp and the locally available labour, an average solid waste generation rate of 0.5 kg/capita/day¹¹ is adopted for the estimation of solid waste generation. Based on this assumption, a total of about 50 kg of solid waste will be generated from construction camps on daily basis.</p>	<p>through proper solid waste management system. The Contractor will coordinate with local representatives and administration of the concerned solid waste management department for the disposal of solid waste; The Contractor must develop a plan of action with the help of concerned solid waste management department for transporting the waste to the disposal site; Toxic waste will be handled, stored, transported and disposed separately. Mitigations mentioned in section 6.9.13 shall be adopted.</p>	<p>Waste Management plan implementation</p>		
	<p>Impact on Water Resources (Surface and Groundwater Contamination)</p> <p>The proposed Project will traverse through various Nullahs at different locations. These surface water resources may get contaminated by the fuel and chemical spills, or by solid waste and effluents generated by the kitchens and toilets at the construction camp sites. Moreover, runoff from the chemical storage</p>	<p>As a mandatory step, all the effluents will be disposed as per the requirements of NEQS. Moreover, to reduce the risk of surface and groundwater contamination, good management practices will be adopted to ensure that fuels, chemicals, raw sewage and wastewater effluent are disposed of in a controlled manner. Mitigations mentioned in section 6.9.14 shall be adopted.</p>	<p>Visual observation Regular environmental monitoring, sampling and testing reports Waste Management plan implementation</p>	CC	Proponent

Source: The World Bank Report 2012 – What a Waste: A global review of solid waste management. Based on UNEP estimates for waste generation in the Asia Pacific. Average is 0.45 kg/capita/day.

Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Indicators	Responsibility	
				Implementation	Monitoring
12	<p>areas may also contaminate the surface water bodies</p> <p>Waste Management from Asphalt and Batching Plants</p> <p>Concrete and asphalt have limited usable life, after which they become waste. If not used within the time span, their wastage will have major financial implications. Further, their disposal will become very difficult because of the large quantities involved.</p>	<p>The contractor will develop specific EMPs for asphalt plants and concrete batching plants. These plans will incorporate the general measures as applicable to the entire project, but will also have focused mitigations for solid waste from these plants.</p> <p>The plan will be reviewed and approved by SCs</p> <p>Mitigations mentioned in section 6.9.15 shall be adopted.</p>	<p>Visual observation</p> <p>Regular environmental monitoring, sampling and testing reports</p> <p>Waste Management plan implementation</p>	CC	Proponent
13	<p>GHG Emissions</p> <p>The main sources of greenhouse gases (CO₂, CH₄, NO_x etc.) during the construction activities of the proposed Project will include both mobile and stationary sources. The mobile source will be the construction and transportation vehicles while the stationary source will be the batching and asphalt plants. Emission of greenhouse gases cause global warming and other climatic changes on regional and global scale.</p>	<p>Regular motioning of the vehicles for engine efficiency;</p> <p>Avoid idling of construction vehicles;</p> <p>Alternative energy resources shall be considered where possible; and</p> <p>The Contractor shall ensure the compliance with NEQS</p> <p>Mitigations mentioned in section 6.9.16 shall be adopted.</p>	<p>Visual observation</p> <p>Regular environmental monitoring, sampling and testing reports.</p>	CC	Proponent
14	<p>Discovery of Heritage Sites and Structures during Excavation</p> <p>During excavation, there is a chance of finding artifacts.</p>	<ul style="list-style-type: none"> PMU-NHA or the Contractor should acquire an approval from the concerned department prior to construction; and 	<p>Chance Find Procedure implementation</p>	CC	Proponent



Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Indicators	Responsibility	
				Implementation	Monitoring
15	<p>Emergency Preparedness</p> <p>The construction of the proposed Project may encounter emergencies. In addition, disasters such as earthquakes and fires may occur. An inefficient response may lead to an accident or critical injury.</p>	<ul style="list-style-type: none"> Follow steps mentioned in a <i>Chance Find Procedure</i> (attached as Annex-IX) in the event, if any unknown cultural heritage is found during any excavation activity. <p>Mitigations mentioned in section 6.9.17 shall be adopted.</p> <ul style="list-style-type: none"> An ERP for earthquakes and manmade disasters should be developed by the Contractor in coordination with SC and PMU-NHA should be implemented in close consultation with the RESCUE Services and other concerned departments; 	Visual observation Emergency Response Plan Implementation.	CC	Proponent
16	<p>Ambient Air Quality</p> <p>Air quality will be affected by fugitive dust emissions from construction machinery; dust from the unpaved surface and construction vehicles. Emissions may be carried over longer distances depending upon the wind speed, direction, temperature of surrounding air and atmospheric stability.</p>	<p>Mitigations mentioned in section 6.9.18 and 7.8.19 shall be adopted.</p> <p>All vehicles, machinery, equipment and generators used during construction activities should be kept in good working condition and be properly tuned and maintained in order to minimize the exhaust emissions. Emissions from batching / asphalt plants can be controlled efficiently by the installation of cyclone / scrubbers. Diesel operated equipment should be equipped with well-maintained fuel filter and may be replaced timely (if required).</p>	Visual observation Regular environmental monitoring, sampling and testing reports Vehicle maintenance records Water sprinkling records.	CC	Proponent



Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Indicators	Responsibility	
				Implementation	Monitoring
17	<p>The sensitive receptors identified within or near the RoW are educational institutions and religious and cultural places etc. which may be affected during construction phase, due to emission of air pollutants. The construction activities will also result in increased air pollution in the area.</p> <p>Noise/Vibration</p> <p>The noise and vibration will be produced due to the operation of construction machinery and equipment. Sources of noise and vibration during construction are heavy machinery such as bulldozers, excavators, stabilizers, concrete mixing plant, pneumatic drills, stone crushers, asphalt plants and other equipment's. Psychological effects of distraction of attention, irritation and short temperedness in the exposed persons due to persistently higher noise levels. Vibration generated by construction activity has the potential to damage structures.</p>	<p>NEQS applicable to gaseous emissions generated by construction vehicles, equipment and machinery should be enforced during construction works. Regular monitoring of air quality in accordance with NEQS.</p> <p>Mitigations mentioned in section 6.9.8 shall be adopted.</p> <p>There are a variety of ways by which construction equipment and worksite noise can be controlled. Quieter Equipment, Barrier Protection, Work Activity Scheduling and noise Perimeter Zones (NPZ) are few control to limit exposure to noisy processes or equipment to as few workers as possible.</p> <p>Timing of the construction works to be conducted during the recommended operational hours, to reduce vibration levels to residential properties</p> <p>Mitigations mentioned in section 6.9.9 shall be adopted.</p>	<p>Physical observation</p> <p>Regular environmental monitoring, sampling and testing reports</p> <p>Vehicle maintenance records</p>	CC	Proponent
18	<p>Flora</p> <p>The project will involve destruction of vegetation cover on construction areas particularly along proposed road construction.</p>	<p>Incorporate technical design measures to minimize removal of trees, if possible;</p> <p>Cutting of trees and disturbance shall be avoided, as far as possible so, that</p>	<p>Tree compensation record</p> <p>Visual observations</p> <p>Regular monitoring, audit and checks</p>	CC	Proponent



Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Indicators	Responsibility	
				Implementation	Monitoring
	Approximately 3,430 mature, sub-mature, pole crop and saplings of different tree/plants species may be removed during the construction phase of the project.	<p>negative effects on the process of natural regeneration of species are minimized and possible alternate route must be considered for proposed road, in which minimum ecological and environmental losses are expected.</p> <p>A tree plantation program shall be formulated with the recommendations and technical support of concerned Forest Department.</p> <p>Total 34300 trees shall be planted though forest department.</p> <p>As a principal, ten trees shall be planted in place of felling of one tree in consideration of mortality</p>			
19	<p>Fauna</p> <p>During construction phase the existing population of birds, mammals and reptiles of the construction areas will be affected due to disturbance arising from construction activities involving excavation, movement of machinery and vehicular traffic, movement of labor, camping, etc.</p>	<p>Mitigations mentioned in section 6.9.23 shall be adopted.</p> <p>Care shall be taken during construction activities for avoiding purposely or chance killing of animals;</p> <p>If any wild species and habitat is found during construction, it must be dealt carefully and local wildlife department officials should be informed;</p> <p>Special measures shall be adopted to minimize impacts on the wild birds, such as avoiding noise generating activities during the critical periods of breeding.</p> <p>Mitigations mentioned in section 6.9.24 shall be adopted.</p>	<p>Departmental consultation record</p> <p>Visual observations</p> <p>Regular monitoring, audit and checks</p>	CC	Proponent



Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Indicators	Responsibility	
				Implementation	Monitoring
20	<p>Social Impacts</p> <p>Social and Cultural Conflicts;</p> <p>Health Impacts (Communicable Diseases)</p>	<p>Local labor especially from nearby communities should be given preference for the construction works; Careful planning and training of work force to minimize disturbance to the local people;</p> <p>Public notification through print or electronic media during the entire construction phase to avoid any inconvenience in accessibility to the locals; and</p> <p>Adequate training of especially for the transitive workforce of the station (involved both in the construction process and in the commissioning) to regard the customs of the area so that the locals do not feel insecure.</p> <p>Proper check-up of skilled and unskilled workers before their hiring;</p> <p>Labour camp should be away from the residential area and workers' management plan should be formulated by Contractor to minimize the adverse impacts on local communities and workers;</p> <p>Trainings, awareness and campaigns should be conducted for workers and surrounding communities on awareness and prevention of HIV/AIDS and COVID-19;</p> <p>Workers should be educated for personal hygiene and the sanitation concerns, leading to communicable and non-communicable diseases;</p>	<p>Record register of all the issues and rational expectations desired by the local public;</p> <p>Camp established at least 500m away from the nearest community; Local hired workforce;</p> <p>Any complaint from the local community.</p> <p>Approved OHS Plan, evidence of OHS trainings conducted.</p> <p>Accident/incident reported.</p> <p>Training records Health and safety manual</p> <p>Contractor will implement the SOPs related to the Construction industry. Health and safety manual.</p>	CC	Proponent

Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Indicators	Responsibility	
				Implementation	Monitoring
21	<p>Gender Based Violence (GBV)</p> <p>The project route is passing through the urban and semi urban areas where women are involved in working activities.</p> <p>During construction phase gender based violence might arise due to discrimination made against women by unequal work distribution and unequal pay structure among others. Sexual harassment against women might occur as a consequence of mixing of men and women at the construction site, and moving on the roads, bus stops and markets. Educational institutions near the project alignment are also sensitive regarding gender issues.</p> <p>Inhabitants of the project area have mix economic background and different sources of income. Children of low income groups mostly involve in different earning</p>	<p>Water should not be allowed to stagnate even if clean, and measures should be taken to cover the area; and Insecticides should be periodically sprayed.</p> <p>Mitigations mentioned in section 6.9.24 to 6.9.26 shall be adopted.</p> <p>Awareness should be created among the females at individual and community levels about the constructions sights;</p> <p>The Contractor should make sure that no discrimination is made on the basis of gender while hiring of workers;</p> <p>Raise awareness among the communities of the potential risks of GBV, and establish response services in the communities that can respond to instances of GBV (particularly those related to issues of labour influx);</p> <p>Contractor should take proper measures to address and resolve issues relating to harassment, intimidation, and exploitation, especially in relation to women.</p> <p>Awareness should be created among the local communities about the adverse impacts of child labour.</p> <p>Contractor through contractual agreement should be bound to follow the labor standards, rules and regulations during hiring the labor force and all activities should be monitored by</p>	<ul style="list-style-type: none"> • Grievance redress record • Minutes of meetings of community/ gender consultation 	CC	Proponent



Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Indicators	Responsibility	
				Implementation	Monitoring
	activities, as their parents prefer to get their children hired in small shops as helpers, and waiters in hotels for earning money, and supporting household livelihoods.	the social and environmental staff of the implementing agency; Contractor should ensure the presence of all persons at site are adults and have their proper identity cards with them.			
22	Livelihood The construction activity may disturb the business and livelihoods of the shopkeepers and workers doing their businesses along the proposed alignment due to the excavation activities. The main commercial activities in these areas include shops, grocery stores, fruit and vegetable shops, barbers, workshops, restaurants, and nurseries.	Mitigations mentioned in section 6.9.27 shall be adopted. Proper compensation should be provided to all the affectees losing their livelihoods along the route Proper awareness and training should be conducted among the affectees regarding proposed Project benefits, reasons for acquiring lands and compensations to be provided. Mitigations mentioned in section 6.9.28 shall be adopted.	Compensation record. Grievance redress record	CC	Proponent
23	Influx of Labor Social problems and conflicts that are associated with Labor Influx are risk of social conflict, increased risk of illegitimate behavior and crime, impacts on community dynamics, Local inflation of prices, accommodations and rents, increase in traffic and related accidents, etc.	Labor camp(s) should be established away from residential population; Preference should be given to the local people to work with contractor, and contractor should hire maximum labour force from the project area because this will reduce the labour influx. Mitigations mentioned in section 6.9.29 shall be adopted.	Minutes of meetings of community Consultation Dissemination relevant material.	CC	Proponent
24	Public Utilities	The provision in the design and budget for the relocation of the		CC, Design Consultant	Proponent



Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Indicators	Responsibility	
				Implementation	Monitoring
25	<p>Due to the proposed Project, public utilities (transmissions lines, PTCL exchange/ transmission system, gas pipelines, water supply, sewerage and drainage pipe lines etc.) may be affected creating disruption of public services and inconvenience to the local residents. This impact is medium adverse in nature</p> <p>Coronavirus Disease (COVID-19)</p> <p>Coronavirus disease (COVID-19) may be introduced due to the immigration of workers associated with the proposed subprojects.</p>	<p>existing utility infrastructures wherever required shall be finalized in consultation with the concerned department.</p> <p>Mitigations mentioned in section 6.8.12 shall be adopted.</p> <ul style="list-style-type: none">All workers must perform complete sanitization at the site as per updated / latest SOPs/guidelines issued by WHO and the national guidelines issued by the GoP.All workers must wear a mask and gloves as soon as they arrive at site and must keep wearing it at all times while present at the work site and their body temperature must be checked;Make alcohol-based hand sanitizer (at least 70%) available for the workers handling deliveriesAt the work site(s), social distancing measures must be strictly implemented and gathering of workers at any		CC	Proponent



Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Indicators	Responsibility	
				Implementation	Monitoring
Operation and Maintenance Phase					
1	<p>Landscape</p> <p>During the operation stage, new saplings of different plants and trees would be planted to enhance the aesthetics and compensate the loss of affected trees. This will have a positive impact of permanent nature. The presence of adequate flora at available spaces along the proposed alignment will help in absorbing flue gases, emitting from a large number of vehicles and public transport passing through the project area, which shall help improve the air quality.</p>	<p>location at the work site(s) must be strictly forbidden.</p> <p>Mitigations mentioned in section 6.9.29 shall be adopted.</p> <p>The saplings planted in the project area against the trees affected should be properly maintained throughout their growth.</p> <p>Mitigations mentioned in section 6.10.1 shall be adopted.</p>	<p>Monitoring of plant maintenance activities records</p>	<p>Proponent</p>	<p>Proponent</p>
2	<p>Air Quality</p> <p>Improvement in road condition will help reduce traffic related emissions in the short term by allowing a smoother traffic flow. However, in the longer run, increased traffic levels may lead to higher values of emissions.</p>	<p>PMU NHA with the help of KP EPA may set up system to monitor air quality along Project area in accordance with NEQS for a specific period to record the quality of air during the operation phase.</p> <p>Mitigations mentioned in section 6.10.2 shall be adopted.</p>	<p>Visual observation Regular environmental monitoring, sampling and testing reports.</p>	<p>Proponent</p>	<p>Proponent</p>
3	<p>Noise and Vibration</p>	<p>Provision of adequate noise barriers such as hedges and indigenous tree</p>	<p>Physical observation.</p>	<p>Proponent</p>	<p>Proponent</p>



Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Indicators	Responsibility	
				Implementation	Monitoring
	The movement of vehicles and usage of horns will create noise which will be a hazard for the nearby residents/built-up areas	species will reduce the noise. Further improvement can be made by enforcing the laws and getting the vehicles tested, regularly after a specific time period, by some reputable vehicle testing laboratory and obtaining a certificate. A tree plantation plan (as suggested in this EIA report) is strongly recommended to reduce the noise propagation to the receptors as an additional advantage of road aesthetics.	Regular environmental monitoring, sampling and testing reports.		
4	Road Safety Enhanced vehicular movement and speed in the long run may result in road safety issues like traffic accidents. This impact is permanent but moderately adverse in nature, since the frequency of accidents may be lowered, but their intensity may be quite severe due to enhanced speeds at which vehicles will move.	Mitigations mentioned in section 6.10.3 shall be adopted. Strict enforcement of speed limits, installation of speed guns and channelization of traffic with respect to categories (heavy vehicle traffic and light vehicle traffic), should be ensured for the smooth flow of traffic moving from major road crossings. Enforcement of penalties for the violators will reduce the significance of this impact. Mitigations mentioned in section 6.10.4 shall be adopted.	Road safety enforcement record Challan / penalties record Accident record Audits and check regularly	Proponent	
5	Drainage During the operational phase, poor maintenance of the road drainage system, particularly during the monsoon season can cause nuisance to the travelers and public	The impact can be controlled/reduced by timely and continuous maintenance/cleaning of the drainage system; and Placement of sign boards instructing not to dispose of solid waste to avoid choking of drain around the bridge and at grade road alignment.	Maintenance and cleaning record Audits and check regularly	Proponent	

Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Indicators	Responsibility	
				Implementation	Monitoring
6	<p>due to flooding in the existing drainage line. In case of choking of road drainage, the increased surface runoff due to heavy rains may accumulate at different locations of the proposed Project and can cause traffic jams.</p> <p>Road Maintenance Works and Heavy Traffic</p> <p>During the operational phase, different maintenance works will be carried out throughout the project life. Laborers or the staff involved in these maintenance works are exposed to health and safety issues.</p>	<p>Mitigations mentioned in section 6.10.5 shall be adopted.</p> <p>Implementation of HSE Plans during the maintenance period; Strict implementation of personal protective equipment's PPEs; Understanding and training of staff on O&M Manual;</p> <p>Mitigations mentioned in section 6.10.6 shall be adopted.</p>	<p>Physical observation Regular monitoring, audits and check reports during work.</p>	<p>Proponent</p>	<p>Proponent</p>
7	<p>Flora</p> <p>During operational stage of the Project, there will be minimal effect on flora or release of any significant pressure detrimental to flora. Low level impact is expected at operational phase on Flora due to the O&M activities.</p>	<p>The implementation of plantation plan recommends compensation for cutting of trees and work should be started during operational phase to ensure the ecological balance and to avoid any impact on local environment; Proper check and balance for above activities is highly recommended. Plantations so raised must be maintained according to the Silvicultural practices which includes proper irrigation, cleaning, pruning, thinning at prescribed intensity, silt clearance and trench-opening, etc.;</p> <p>Maintenance and security of the plantation should be done for at-least five years (in consultation with the Forest department). Measures such as</p>	<p>Physical observation Regular monitoring, audits and check reports.</p>	<p>Proponent</p>	<p>Proponent</p>

Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Indicators	Responsibility	
				Implementation	Monitoring
8	<p>Fauna</p> <p>There is no protected area, game reserve, game sanctuary or national park in the Project area so, no major impact on wildlife and livestock in the area is expected through noise, vibration and any type of normal activity in the project area.</p>	<p>fencing, watch guards and fire protection should be considered;</p> <p>All activities must be done under the technical supervision of Forest Department.</p> <p>Mitigations mentioned in section 6.10.7 shall be adopted.</p> <p>Provision for passing reptiles, amphibians and small mammals should be considered by the design, construction supervision team and contractor to implement the activities in a way that the above species (if found by chance) may use the culverts already design for water ways and other purposes. Here no influx of such fauna is expected as the habitat is highly degraded and the road is existing from the decades so, original fauna of the area is vanished and some species have already migrated to safe heavens</p>	<p>Physical observation</p> <p>Regular monitoring, audits and check reports.</p>	Proponent	
9	<p>Increase in Land Value</p> <p>The proposed Project is expected to increase the land values, especially in villages where little infrastructure is present land owners will have an opportunity to</p>	<p>Mitigations mentioned in section 6.10.8 shall be adopted.</p> <p>No mitigation required (positive impact)</p>	NA	NA	



N/A

Sr. No.	Impacts	Mitigation Measure	Performance Monitoring Indicators	Responsibility	
				Implementation	Monitoring
10	sell their land on increased prices and start new businesses. Decrease in Operating Cost of Vehicles	No mitigation required (positive impact)	NA	NA	
11	Economic Boost and Community Development	No mitigation required (positive impact)	NA	NA	



7.8 ENVIRONMENTAL MONITORING PLAN

Environmental monitoring provides timely and useful information to the project management and implementation agencies. Conceptually, "monitoring" means to check and balance, on a regular basis, the status of the project activities and realization of various developmental targets during construction, O&M. It helps in timely identification/analysis and removal of the bottlenecks and expedites actions. Certain environmental parameters (physical, ecological and social) are selected and quantitative analysis is carried out. The results of analysis are compared with the guidelines; standards and pre-project condition to investigate whether the EMP and its implementation are effective for the mitigation of impacts or not. The objectives of environmental monitoring plan during the construction and O&M phases will be as follows:

- Monitor the actual project impacts on physical, ecological and socio-economic receptors;
- Recommend mitigation measures for any unforeseen impact or where the impact level exceeds the anticipated level in the EIA;
- Ensure compliance with legal and community obligations including safety during construction and O&M phases;
- Ensure the safe disposal of excess construction materials, solid waste, water and wastewater and gaseous emissions;
- Appraise the adequacy of the EIA with respect to the project's predicted long-term impacts on the area's physical, ecological and socio-economic environment;
- Evaluate the effectiveness of the mitigation measures proposed in the EMP and recommend improvements in EMP, if required; and
- Compile periodic incidents/accidents data to support analyses that will help to minimize future risks.

7.8.1 Checklists for Environmental Monitoring

For the purpose of conducting environmental monitoring, the following checklists (for each construction) will be prepared and used at the site:

- Campsite & Nearby Communities Checklist;
- Borrow Area and Quarries Checklist (for each site);
- Waste Material Disposal;
- Construction Site Checklist;
- Road Checklist;
- Ecological Checklist; and
- Sociological Checklist.

7.8.2 Monitoring Strategy

Under the proposed monitoring strategy, it is recommended that NHA should be responsible for all the monitoring activities. Client will engage a competent consultant to conduct environmental monitoring on a periodic basis. The overall objective of the environmental monitoring is to ensure that the key environmental parameters in the project area remain within the acceptable limits specified by the National Environmental Quality Standards (NEQS) (and other relevant benchmarks) throughout the project execution. For this purpose, the



Independent Environmental Monitor (IEM) will carry out the periodic sampling, monitoring, and analysis of the key environmental parameters specified in the EMP and provide their results to the Client. All the findings and results in the form of monitoring report will be finally shared with respective KP EPA by the Client.

The monitoring program has been designed carefully considering the identified impacts mentioned in Chapter-7 and some additions or deletions probably in frequency may be taken up in this program after learning lessons from one-year operation of the Project through Change Record Register. Table 7.2 provides environmental monitoring schedule for construction and operations stages of the Proposed Project.

Table 7.2: Environmental Monitoring Plan

Sr. No.	Receptors	Monitoring Parameters / Performance Indicator	Location	Monitoring Mechanism	Monitoring and Reporting Frequency	Duration
1	Water Resources/ Water Quality	Compliance with all parameters as per NEQS,	<ul style="list-style-type: none">Major receptor i.e. nullahs/ drains, residential areas within the RoW/Col. However, estimated sampling points are three (3) wastewater/surface water and three (3) for Drinking Water /Groundwater which will be verified at construction stage. Other proposed effluent discharge points are: <ul style="list-style-type: none">Contractors campsConcrete preparation plantsFuel (Petrol, Oil and Grease) products storages.Vehicle and machines repairing and servicing yards.	<ul style="list-style-type: none">Visual checks of laboratory activitiesDiscrete grab sampling and laboratory testing of water samples by EPA approved Laboratory for monitoring.	Once before the start of construction by activity monitors and reported On quarterly basis during the construction Bi-annually for at least one year during O&M.	As per NEQS .
2	Soil Contamination	Soil contamination, uncontrolled solid waste disposal	<ul style="list-style-type: none">Sites with severe contamination. Other proposed sampling sites are: <ul style="list-style-type: none">Construction Camp.	Visual observations and checks of laboratory activities	Once before the start of construction by activity monitors and reported	



Sr. No.	Receptors	Monitoring Parameters / Performance Indicator	Location	Monitoring Mechanism	Monitoring and Reporting Frequency	Duration
		activities at sites.	<ul style="list-style-type: none">- Equipment washing yards.- Spillage points of fuel, chemicals and lubricants.	Sampling and laboratory testing for soil samples.	On quarterly basis during the construction Bi-annually for at least one year during O&M.	
3	Land Resources	Landuse change from agriculture to residential and commercial.	<ul style="list-style-type: none">- Sites with significant landuse change.	Random visits and visual observations of landuse change.	Once before the start of construction by activity monitors and reported On Monthly basis during the construction Bi-annually for at least one year during O&M.	
4	Dust Emissions	Compliance with PM ₁₀ PM _{2.5} per NEQS	Sensitive receptors like residential areas within the RoW/Col (near Interchanges, residential community). Estimated sampling points are three (3) which will be verified during construction stage. Other proposed effluent discharge points are: <ul style="list-style-type: none">- Contractors camps- Concrete preparation plants.	Visual checks of laboratory activities Onsite Ambient Air Monitoring equipment	Once before the start of construction by activity monitors and reported On quarterly basis during the construction Bi-annually for at least one year during O&M.	
5	Noise Pollution	Compliance with dBA Leq. as per NEQS	<ul style="list-style-type: none">- Sensitive receptors like residential areas within the RoW/Col (near Interchanges, residential community). Estimated sampling points are three (3) which will	Visual checks of laboratory activities Monitoring of noise level at site.	Once before the start of construction by activity monitors and reported On quarterly basis during the construction	



Sr. No.	Receptors	Monitoring Parameters / Performance Indicator	Location	Monitoring Mechanism	Monitoring and Reporting Frequency	Duration
			<p>be verified during construction stage.</p> <p>Other proposed sampling sites are:</p> <ul style="list-style-type: none"> - Construction camps. - Concrete preparing plants. - Equipment yards. 		Bi-annually for at least one year during O&M.	
6	Fumes and gases	Monitoring of CO, CO ₂ , SO _x , NO _x , HC and PM _{2.5} , PM ₁₀ , Vehicular emissions and compliance with NEQS	<ul style="list-style-type: none"> - Major receptors like residential areas within the RoW/Col (near, residential community). Estimated sampling points are three (3) which will be verified during construction stage. Emissions from the silencers of heavy machinery, trucks and other vehicles. 	<p>Visual checks of laboratory activities</p> <p>Onsite monitoring of ambient air quality will be preferred.</p>	<p>Once before the start of construction by activity monitors and reported</p> <p>On quarterly basis during the construction</p> <p>Bi-annually for at least one year during O&M.</p>	
7	Ecological Resources	Disturbance to natural habitat, uncontrolled floral cutting which can be avoidable.	<ul style="list-style-type: none"> - Natural habitats along the RoW/Col (i.e. trees, crops etc.). 	<p>Visual checks to ensure that only marked trees are cut within the Project corridor.</p> <p>Monitoring of Wildlife / birds hunting.</p>	<p>Once prior to the start of construction</p> <p>Monitoring and reporting on monthly basis during the construction stage.</p> <p>Bi-annual monitoring and reporting during the operation stage.</p>	
8	Houses and other related structures	Disturbance and removal avoidable of houses and other related	<ul style="list-style-type: none"> - Houses, animal and other related structures within the RoW/Col. 	Random visits and consultations with AP's.	Prior to the start of construction.	



Sr. No.	Receptors	Monitoring Parameters / Performance Indicator	Location	Monitoring Mechanism	Monitoring and Reporting Frequency	Duration
		structures which are within the Project corridor.	These structures will be verified prior to the start of construction.			
9	Public Infrastructure	Disturbance or damage to public infrastructure	– Public infrastructures within the RoW/Col. These structures will be verified prior to the start of construction.	Random visits and consultations with AP's.	Prior to the start of construction.	
10	Community around the Project corridor	Use of common resources. Hindrance to mobility. Community health and safety	• Communities within the RoW/Col.	Community consultations.	Prior to the start of construction and during the construction stage.	



7.9 PLANNING FOR EMP IMPLEMENTATION

7.9.1 NOC and Other Approvals

Provincial Departments of Wildlife, Forest and Archaeology¹²

At the feasibility stage of the Project as per the requirement of EPA guidelines for the Sensitive and Critical Areas, concerned provincial departments are informed through letters for the proposed Project.

During the construction stage, if the implementation of the proposed Project involves the clearing of vegetation and trees which belongs to the forest or wildlife department, the Project Contractor will be responsible for acquiring a No Objection Certificate (NOC) from the provincial forest department. The application for an NOC will need to be endorsed by PMU-NHA. Similarly, if any Archaeological monument or site is crossed by or near to the proposed Project concerned provincial department needs to be contacted for NOC. The Contractor is also required to contact with concerned department before the start of the construction work.

7.9.2 Stakeholder Coordination

Notwithstanding the efforts so far put in for public participation, this activity will have to be pursued through the forthcoming implementation phases of the Project. In particular, the focus will be on the improvement and modification of the proposed intervention designs.

Participation mechanisms facilitate the consultative process and include information sharing and dissemination, disclosure, and participation of affected people and other stakeholders in the proposed Project related activities. In the peculiar social set-up of the Project Area, it is also important to involve the religious leaders as representatives of the public as well as part of effective communication process. They can provide a very effective medium to bring information to the affected male population through Friday prayers. Local business community, especially the affected one, should also be brought into the process of awareness and participation.

The related institutional arrangements should also be in place for continuous consultation throughout the process of planning and implementation. During construction, PMU-NHA will have to implement EMP.

The construction schedule will be updated before the commencement of construction work considering the activities specifically suggested in EMP for its implementation.

7.10 TRAINING AND CAPACITY BUILDING

¹² The contractor is also required to obtain NOC from other concerned departments (which may affect during the construction stage) prior to start of construction to avoid any delay.



To enhance the capacity of the Proponent as well as the Contractor, training will be imparted related to the environmental and social issues of the proposed Project, implementation of mitigation measures and the monitoring protocols and reporting mechanism will also be carried out.

In-house training for the project staff including contractor, consultant and the supervisory staff of the Proponent will be ensured through the provision of one-day basic training and one-day advanced training, covering environmental and social aspects of the development projects in general, and implementation requirements with emphasis on the roles and responsibilities of the proponent and the contractor staff while executing the environmental management and monitoring plan in particular. The training protocols will include the following aspects:

- Procedures for monitoring the air quality parameters and measures to be adopted for avoiding or minimizing air pollution, particularly from the concrete batching plant, haul-trucks, etc.;
- Procedures for monitoring water quality parameters and measures to be adopted for avoiding or minimizing water pollution, particularly from the wastewater effluent generated from the workshops, machinery washing yards, and other obnoxious chemicals;
- Safe waste management and disposal practices;
- Safe noise levels from the construction machinery etc.;
- General housekeeping and cleanliness;
- Social and cultural values of the area;
- Natural resource conservation;
- Communicable diseases especially COVID-19;
- Safety measures against hazards for workforce and the local communities arising from the construction activities;
- Use of safety gadgets by the workforce; and
- Restoration requirements.

A comprehensive training manual will be developed and implemented by the Contractor with prior consent of SC environmental staff.

7.11 COMMUNICATION AND DOCUMENTATION

Communication and documentation is an essential feature of EMP. The key features of such mechanism are:

7.11.1 Data Recording and Maintenance

All forms to be used for recording information during the environmental monitoring will follow a standard format which will correspond to the data base in to which all the gathered information will be placed. Check boxes will be used as much as possible to facilitate data entry. Tracking system will be developed for each form.

7.11.2 Database

The database may include the following information:



- Training programs;
- Staff deployment;
- Non-compliances;
- Corrective actions
- List of environmental data; and
- List of environmental data to be maintained:
 - Soil and land pollution;
 - Disposal of waste;
 - Water resources;
 - Fuel oil and chemical spills;
 - Vegetation record;
 - Noise pollution;
 - Air and dust pollution;
 - Socio-economic data; and
 - Ecological sensitivities.

7.11.3 Meetings and Reporting

Monthly meetings will be held at site during the construction phase. The purpose of these meetings will be to discuss the routine activities, non-compliances and their remedial measures. Various reports will also be produced at periodic time intervals, as provided in **Table 7.3** along with information regarding persons responsible for report preparation and review process. Additionally, minutes of meeting will also be submitted as part of routine environmental reports. The progress reports will also be submitted to EPA, Khyber Pakhtunkhwa as per conditions of NOC.

Table 7.3: Periodic Reporting Mechanism

Sr. No.	Report Category	Prepared by	Reviewed by
1	Monthly	Contractors' environmental staff	PMU-NHA / SC
2	Quarterly	Contractors' environmental staff	PMU-NHA/ SC
4	Annual Report	Contractors' environmental staff	PMU-NHA/ SC
5	Completion Report	Contractors' environmental staff	PMU-NHA/ SC

7.11.4 Social Complaint Register

The Contractor will maintain a register of complaints record from local communities and measures taken to mitigate these concerns.

7.11.5 Photographic Records

Contractors will maintain photographic records during the implementation of the proposed Project. As a minimum, the photographic records will include the site photographs, all the roads, camp sites and monitoring activities, etc.

7.11.6 Non-Compliance of the EMP



The implementation of the proposed EMP involves inputs from various functionaries. The Contractor will be primarily responsible for ensuring implementation of the mitigation measures proposed in the EMP, which will be part of the contract documents. The provision of the environmental mitigation cost will be made in the total cost of Project, for which the Contractor will be paid on the basis of monthly compliance reports. However, if the Contractor fails to comply with the implementation of EMP and submission of the monthly compliance reports, deductions will be made from the payments to the Contractor claimed under the heads of environmental components.

7.11.7 Review of Recorded Data

All the data and communication recorded and maintained by the Contractor will be periodically reviewed and checked by SC and PMU-NHA and necessary action will be recommended to Contractor to improve the recording and documentation.

7.12 MANAGEMENT PLANS

Various management plans have been prepared as a part of EMP for the better management and implementation of EMP during all phases of the proposed Project. However, these plans will be used by the Contractor as guidelines and updated prior to start of construction activities along with approval from PMU-NHA should be sought. These plans are listed below:

- 1) Tree Plantation / Reforestation Plan;
- 2) Health, Safety and Environment (HSE) Management Plan;
- 3) Emergency Preparedness and Response Plan;
- 4) Restoration and Rehabilitation Plan;
- 5) Waste Management Plan;
- 6) Disaster Management Plan;
- 7) Drinking Water Supply and Sanitation Plan
- 8) Traffic Management Plan;
- 9) Chance Find Procedure
- 10) Quarry Management Plan; and
- 11) Resource Conservation Plan.

7.12.1 Tree Plantation / Reforestation Plan

The basic purpose of afforestation/plantation of suitable species in the project area is to reduce the risk been made due to different construction activities for the proposed project. The expected risk made will be compensated by planting of saplings to enhance green cover and improve the overall environment of the area. Afforestation will not only reduce the risk been made but will also increase the Green cover, carrying capacity and aesthetics of the area along with many positive aspects and impacts.

Plantation will be done after the construction work immediately. Plantation of indigenous trees species is highly important to maintain the biodiversity and ecological balance. It is also important to prevent global warming, soil erosion and pollution. Afforestation purifies the environment and helps in reducing the carbon dioxide level. Along with the importance of construction, the afforestation activity will further help in enhancing the socio-economic condition of the area and project sustainability.



Note: *The Forest Department KP may be engaged for carrying out the proposed activities.*

The details are attached as **Annex-XII**.

7.12.2 HSE Management Plan

Health risks and work safety problems may result at the workplace if the working conditions provide unsafe and/or unfavorable working environment due to storage, handling and transport of hazardous construction material. Workers should be provided with safe and healthy working environment taking into account risks inherent to the particular sector and specific classes of hazards in Project Area. During construction phase, Contractor will be responsible for all HSE related issues and to comply with national laws and international standards for occupational health and safety. Guideline for contractor's Occupational Health and Safety Plan is attached as **Annex-VI** for the preparation of detailed HSE Management Plan by the Contractor. The ultimate goal of the plan is to eliminate any injury to human and damage to facilities, materials and the environment.

The following measures are identified for health, safety, and environment protection during all activities of the proposed Project to minimize risk of accidents, which could endanger the life of personnel, cause damage to properties and environment:

- All contractor staff shall be well informed and trained on the HSE policies and guidelines;
- Contractor shall provide adequate health services as well as site first aid services for its workforce;
- The main priority of the contractor shall be to prevent accidents during mobilization, construction phase of the proposed Project. Prevention of workplace accidents during the construction activities will be achieved using approved work plan/instructions by the supervisors;
- Work safety measures and good workmanship practices shall be followed by the contractor to ensure no health risks for workers;
- Provision of adequate sanitation, washing, cooking and dormitory facilities;
- Proper maintenance of facilities for workers shall be monitored;
- Provision of protective clothing for labourers handling hazardous materials, e.g. helmet, adequate footwear for bituminous pavement works, protective goggles, etc. and contractor will ensure strict use of wearing these protective clothing during work activities;
- Elaboration of a contingency planning by the contractor at work site in case of major accidents shall be carried out. A comprehensive emergency preparedness and response plan should be developed and implemented at site;
- A site-specific fire-fighting plan also needs to be developed and implemented by Contractor during construction phase;
- Accidents shall be reported to and investigated by the Contractor. All personnel shall be encouraged to report all accidents/incidents and to cooperate in the investigation of such occurrence. A comprehensive accident/incident report should be produced to PMU-NHA for its review and necessary action;
- Adequate signage, lightning devices, barriers, and persons with flags during construction to manage traffic at haulage and access roads shall be conducted;
- The communicable disease of most concern during construction phase, like sexually-transmitted diseases such as HIV/AIDS, COVID-19 should be prevented by successful



initiative typically involving health awareness, education initiatives, training health workers in disease treatment, immunization program and providing health service;

- Reducing the impacts of vector borne diseases on long-term health effect of workers should be accomplished through implementation of diverse interventions aimed at eliminating the factors that lead to disease;
- All construction activities shall be properly managed through careful planning and the applicable and relevant HSE policies; and
- Prior approval from PMU-NHA environment and social team should be sought before starting any construction related activity.

7.12.3 Emergency Preparedness and Response Plan

Emergency Preparedness and Response Plan provides an overview of the procedures to mitigate and control the impacts on community, on occupational health and safety, on the environment and on the Project in the event of emergency situations and to respond in life threatening situations usually occurring suddenly and unexpectedly during the construction and operational phases of the proposed Project. The contractor will be responsible for the preparation of plan and implemented at site after prior review and approval from the supervisory consultant and proponent. Guideline for contractor's EPRP is attached as **Annex-X**.

7.12.4 Restoration and Rehabilitation Plan

The implementation of the proposed Project would involve construction workers' camp for staff and laborers, establishment of fences around construction site, over usage of access roads for movement of heavy machinery/motor vehicles linking to various components of project, offices, borrow/quarry areas, etc. During construction, these activities could also result in accumulation of large amount of unused or spoil material at various sites such as at access roads, muck dumping sites, quarry sites, colonies, offices, etc. which will change the existing land cover in the project area. After completion of the construction work, it is required to restore the disturbed area to its original conditions wherever it is possible that is the sole responsibility of the Contractor. Various engineering and biological measures have been suggested for the restoration of these areas:

- Top-soil should be stored at designated areas before performing excavation activities at quarry sites (if these are agriculture land) and after the completion of all the construction activities, quarry sites (if applicable) and construction sites should be covered with the top-soil to support the growth of plant species;
- The area should be planted with indigenous vegetation that would require the initial establishment of fast-growing grasses along with annuals and perennials, nitrogen fixing herbaceous legumes and non-legume shrubs to increase the soil conditioning and to stabilize the project site;
- Material stockpiles shall be removed as soon as the construction work will be completed;
- All the construction, toxic and hazardous chemicals/materials shall be completely removed from the site;
- All fencing and gates shall be removed and pits shall be backfilled;
- The reconstruction of interrupted drainage channels and pipes shall be carried out;



- Rehabilitation of affected roads should be carried out to avoid any inconvenience to the road commuters; and
- A clearance certificate from the NHA has to be taken by the Contractor in this regard.

7.12.5 Waste Management Plan

Management of solid and hazardous waste is one of the most important issues during construction phase of the Project. It is estimated that around 100 workers will be accommodated at construction camps (total of about 01 camp sites) during construction phase. As a general rule the water consumption will be about 40 liter/capita/day and will subsequently generate about 70 to 80% of this water as sewage. Based on this water consumption around 4 m³/day of water will be utilized for washing, cooking and bathing purposes at each camp site which will generate approximately 3.2m³/day sewage at each the construction camp sites. In addition to that each construction camp site will generate about 50 kg/day of solid waste at site @ 0.5 kg/capita/day.

The major components of the workers' camp waste are garbage, putrescible waste, rubbish and small portion of ashes and residues, wastewater from camps toilets and washing yards, etc. The construction waste will include wastewater, oil spillage from machinery and solid waste (damaged or spoiled materials, temporary and expendable construction materials, etc.). Insecure and unhygienic disposal of the wastes may cause degradation of soil, land and water resources. However, a criterion has been developed for the solid and hazardous waste management at site. The criterion for plan is as follows:

- All the anticipated solid wastes should be collected through a properly designed solid waste management system. Enough number of containers should be placed inside the camps and within the construction area for the collection of various types of waste;
- These containers will help the component separation of various types of waste at source. Classification will be based on organic waste, recyclable waste, reusable waste (for resource and recovery) and waste for disposal site. Based on the conditions of the region, organic waste should be frequently collected to avoid odour problems;
- Recyclable, reusable and waste for disposal site should be collected twice a week and on alternate days and should be transferred to a properly designed disposal site;
- The special strategy for safe handling, storage and use of hazardous substances/material should be developed and ensured at site;
- The sewage system for camps shall be properly designed (pit latrines or, as required, septic tanks) to receive all sanitary wastewaters;
- Lined wash areas shall be constructed within the camp site or at site, for the receipt of wash waters from construction machinery;
- Medical waste and construction waste should be handled with care;
- The pesticide use shall not be allowed at site and for clearance of RoW;
- Construction waste i.e. waste concrete, bricks, cement, etc. should be disposed of at the designated areas; and
- Construction workers and supervisory staff should be encouraged and educated to practice waste minimization, reuse and recycling to reduce quantity of the waste for disposal.



Based on the above guidelines, Contractor(s) will be responsible for the preparation of Waste Management Plan before the commencement of construction activities and its implementation at site after the prior review and approval from SC and proponent.

7.12.6 Disaster Management Plan

A disaster is a sudden, calamitous event that seriously disrupts the functioning of a community or society and causes human, material, and economic or environmental losses that exceed the community 's or society 's ability to cope using its own resources. Disasters are of two types i.e., Natural and Manmade.

The flooding, earthquake, wind storms are the major disastrous phenomena in the region. The mountainous terrain makes the community as well as worker more vulnerable to disasters. The development of poor infrastructural measures, poses greater vulnerability risk in relation to the onset of potential disasters. In such cases, even a moderate disaster could bring devastating effects on communities.

The Provincial Disaster Management Authorities (PDMAs) of Government of Khyber Pakhtunkhwa are mandated for planning, implementing and coordinating all activities in case of the onset of a disaster. Therefore, there is a specific requirement for developing a plan that effectively responds to any Monsoon induced emergency. PDMA specialize in mitigation, preparedness and an organized response to a disaster. The most important role of PDMA lie in providing a platform to come together and strategize management and response to disasters and calamities.

7.12.7 Drinking Water Supply and Sanitation Plan

Separate water supply and sanitation provisions will be needed for the temporary facilities including offices, labour camps and workshops in order not to cause shortages and/or contamination. A Plan will be prepared by the Contractor on basis of the mitigation plans. The Plan will be submitted to the SC for their review and approval before contractor mobilization.

7.12.8 Traffic Management Plan

A comprehensive Traffic Management Plan (TMP) will be developed by Contractor mentioning routes to be followed for transportation of construction machinery and materials e.g. cement, steel, gravels, sand, etc. Traffic Management Plan will comprise following contents necessarily:

- Goals and objectives of plan;
- Purpose & Scope;
- Project specific traffic;
- Roles & responsibilities of contractors' environmental personnel;
- Routes to be followed along with necessary maps;
- Transportation timing; and
- Mechanism to address road accidents (if occurs).



Guidelines for contractor's TMP are attached as **Annex-V**.

7.13 CHANCE FIND PROCEDURE

The purpose of these guidelines is to address the possibility of archaeological deposits, finds and features becoming exposed during earth removing and ground altering activities associated with the construction and to provide procedures to follow in the event of a chance archaeological find. The chance find procedure of archaeological deposits is attached as **Annex- IX**.

7.14 QUARRY MANAGEMENT PLAN

The Contractor is responsible for extraction of resources (if required) for the construction aggregate from quarry area i required to prepare and implement a Quarry Management Plan (QMP) based on the Guidelines for QMP are attached as **Annex-VII**. The overall objective of the QMP is to manage the extraction and processing of a valuable aggregate resource while avoiding, remedying or mitigating adverse effects on the environment and enhancing environmental performance wherever practicable.

7.15 RESOURCE CONSERVATION PLAN

Most of the resources in this world are finite and non-renewable in nature. We are completely dependent on these resources to fulfill all our daily requirements. Therefore, sustainable development calls for the need to conserve resources in a way that meet our needs of present generation as well as future generation, especially the non-renewable resources. Guidelines for the preparation of Resource Conservation Plan by the Contractor are attached as **Annex-XIII**.

7.16 CODES OF PRACTICE

The Contractor should seek to develop codes of practice for its staff and employees in order to ensure that the intrusion of workers in the Project Area does not result in any social and environmental and social issues between the workers and locals which can harm the Project by causing unnecessary delays.

These codes should be based on the principles of environmental protection, occupational health and safety, good engineering practices, respect, integrity and sound ethical values. Each code should include, at minimum, the purpose and objectives, a policy statement from the in charge explaining the importance of this code for the success of the Project, and examples of such conduct. Guidelines for the code of practices are discussed below.

7.16.1 General

General code of conduct should be developed for the Project and should include, at minimum, the following practices:



- Rules and guidelines will be given to the workers regarding the use of common resources such as wood, plants, water sources etc. to ensure their sustainable use;
- The code should also include provisions of the solid waste management plan to address solid waste collection and disposal in order to prevent unhygienic conditions and contamination of soil and water;
- The Contractor will be made arrangements to avoid accidental risks such as traffic signs board and speed control measures for the safety of locals;
- In construction camps, amenities of life including clean food, water and sanitation facilities must be provided to these camps, and the workers should be provided with guidelines on how to dispose of their waste and maintain a sense of hygiene;
- The training of workers in the construction safety procedures, equipping all construction workers with PPEs i.e. safety boots, helmets, gloves, ear plugs, and protective masks also and monitoring their proper and sustained usage;
- The Contractor should ensure that the construction labor is trained in safety procedures for all relevant aspects of construction;
- Formal emergency procedures should be developed for construction site in case of an accident. First Aid Kits and other necessary equipment should be kept available at site along with the list of emergency phone numbers at the construction site to be contacted in case of any accident; and
- The safety of the public at all stages of the construction and operation will be ensured by appropriate public education and safety measures such as use of sign boards, barriers and flags and use of proper illumination at night.

7.16.2 Good Engineering Practices

Good engineering practices should be developed for the Project and should include, at minimum, the following practices:

- Standard Operating Procedures (SOP) for handling, storage and transportation of oil leakages, chemicals and other toxic materials should be strictly followed;
- Workers must be familiar with the MSDS of each chemical used at site. MSDS are provided with each chemical drum. Chemicals will be stored as per their MSDS. Utmost care should be taken during the handling of these chemicals;
- Precautions should be taken to prevent spills and all workers should be trained in proper handling, storage and disposal of hazardous or toxic materials; and
- Proper disposal plans of excavated material.

7.16.3 Cultural Norms

Cultural Code of Practice should be developed for the Project and should include, at minimum, the following practices:

- Self-respect and sensitivity to insult is an important trait of the locals. The poorest among them has his own sense of dignity and honour and he vehemently refuses to submit to any insult. In fact, every inhabitant considers himself equal if not better than his fellow tribesmen and an insult is, therefore, taken as scurrilous reflection on his character. So the contractor should be careful to avoid any unceremonious interaction with the locals and inform their staff to be humble and polite.
- The Contractor should also take care of the norms of local community and their sensitivity towards local customs and traditions;
- The Contractor should brief the staff about local culture and norms;



- As per local culture wearing of pant shirt, half shirts, and short trouser are considered inappropriate attire, therefore the contractor inform the staff to avoid wearing short trousers and short shirt;
- Contractor will strictly warn the staff not to involve in any unethical activities and to obey the local norms and cultural restrictions particularly with reference to women;
- The Contractor will be required to maintain close liaison with the local elders and religious scholars of nearby local community to ensure that any potential conflicts related to common resource utilization for the Project are resolved easily;
- Privacy of women is a major cause of concern for the communities of the Project Area. Due to the Project activities local women may not be able to perform their daily outdoor chores. Women in the Project are participate in other outdoor activities such as livestock rearing, bringing of potable water, collection of fire wood etc. that may be affected by the Project activities;
- The Contractor will have to select the specific timings for the construction activities so as to cause least disturbance to the local population particularly women considering their peak movement hours; and
- The Contractor will warn the staff strictly not to indulge in any un-ethical activities and to obey the local norms and cultural restrictions particularly with reference to women.

If privacy of the nearby households is to be affected, the Contractor will inform the house owner in advance to make some alternative arrangements. Similarly, the Contractor will have to take great care that the construction activities should not affect the privacy particularly with reference to women.

7.17 PUBLIC DISCLOSURE

PMU-NHA will disclose this EIA to all the stakeholders prior to the start of the construction. This report will be made available to all stakeholders. In addition, executive summary of the Report will be translated into Urdu language and made available to the affected communities and locals. The copies will also be kept at construction site for ease in accessibility of the locals. This will ensure the locals to be aware of the Project impacts, its mitigation, responsible staff and mode of implementation. In addition, the executive summary will also be published on PMU-NHA website.

7.18 EMP COST

The cost for EMP will be a part of the contract document with the Contractor. The same may also be included in the total project cost for the implementation of EMP. The cost required for PPEs for one hundred (100) staff including skilled and unskilled during the whole construction stage for twenty-four (24) months is given in the Table 7.4

Table 7.4: Break-up for Personal Protective Equipment cost

Items	Quantity	Cost / Item (Rs.)	Total Cost (Rs.)
Dust masks	4800	20	96,000
Safety Shoes	200	2,000	400,000
Gloves	2400	300	720,000
First Aid Box	1	5,000	5000
Ear Plugs	200	30	6000
Safety Helmets	100	1,500	150,000



Items	Quantity	Cost / Item (Rs.)	Total Cost (Rs.)
Safety Jackets (Hi Vis)	200	600	120,000
Total			1,497,000

The total estimated cost for the environmental and social management, monitoring and auditing during pre-construction, construction and O&M (annual cost and will be updated for next upcoming years accordingly) comes to about PKRs. Million and given in Table 7.5.

Table 7.5: Environmental Management and Monitoring Cost Estimate

Sr. No.	Parameter	Mechanism	Frequency	Unit Rate (PKR)	Quantity	Cost (PKRs)	Remarks
A PRE- CONSTRUCTION PHASE							
A-1 Environmental Monitoring Cost							
1	Water Resources/ Water Quality	Discrete grab sampling and laboratory testing of water samples by EPA approved Laboratory for monitoring.	Once	20,000	6	120,000	One-time monitoring shall be carried out before the mobilization of Contractor. • Groundwater Samples=3 • Wastewater / Surface water Samples=3
2	Noise Levels	dBA Leq. as per NEQS	Once	2,000	3	6,000	
3	Ambient Air Monitoring	Monitoring of parameters as NEQS (for Vehicular emissions) & (for ambient Air and Noise) by EPA approved Laboratory	Once	30,000	3	90,000	
Sub-Total (A-1)						216,000	
A-2 Tree Plantation Cost							
1	Tree Plantation Cost	Total cost for 3,430 plants and their maintenance for 4 years (two on each side)	Lump Sum			66,267,600	
Sub-Total (A-2)						66,267,600	
Sub-Total A ((A-1)+(A-2))						66,483,600	
B CONSTRUCTION PHASE							
B-1 Environmental Monitoring Cost							
1	Water Resources/ Water Quality	Discrete grab sampling and laboratory testing of water samples by EPA approved	Once	20,000	6*4	480,000	Quarterly monitoring cost for the one (01) years construction period and will be updated each year



Sr. No.	Parameter	Mechanism	Frequency	Unit Rate (PKR)	Quantity	Cost (PKRs)	Remarks
		Laboratory monitoring. for					based on latest rates during construction timeline of the proposed Project. <ul style="list-style-type: none"> • Drinking Water/Groundwater Samples=3 • Wastewater / Surface water Samples=3
2	Noise Levels	dBA Leq. as per NEQS	Once	2,000	3*4	24,000	
3	Ambient Air Monitoring	Monitoring of parameters as NEQS (for Vehicular emissions) & (for ambient Air and Noise) by EPA approved Laboratory	Once	30,000	3*4	360,000	
Sub-Total (B-1)						864,000	Environmental Monitoring Cost for one (01) year
						1,728,000	Environmental Monitoring Cost for two (02) year
B-2 Environmental and Social Management Cost							
1	Environmental Officer	Environment Personnel will monitor / conduct all environment and HSE related activities e.g. monitoring, PPEs, housekeeping, safety signage, emergency preparedness, etc.	Monthly	150,000		3,600,000	This is the tentative monthly cost for two (02) years period for one senior and one junior expert along with their monthly logistics.
				Lump sum (1,500,000)		1,500,000	Cost for PPEs, extinguishers, emergency lights, housekeeping equipment, safety signage and barricade, emergency preparedness kit, first aid kit, etc.
2	Social Officer	Monitoring of social related issues, carry out consultations with locals, Assess the resettlement implementation efficiency, effectiveness, impact and its sustainability, Status of redressal of community	Monthly	150,000		3,600,000	This is the tentative monthly cost for two years period for one senior and one junior expert along with their monthly logistics.



Sr. No.	Parameter	Mechanism	Frequency	Unit Rate (PKR)	Quantity	Cost (PKRs)	Remarks
		complaints and time spent to resolve the community grievances etc.					
3	Training Cost	Environment and social related trainings including COVID-19 referred in Training and Capacity Building. Literature preparation, printed material such as posters & pamphlets trainer(s), and venue, etc.	Monthly	100,000		2,400,000	This is the tentative monthly cost for two years period.
4	Communicable Diseases	Tests should be performed by approved laboratory	Yearly	500,000		1,000,000	This is the tentative cost for two (02) years period for medical tests of kitchen staff at each camp site.
5	Personal Protective Equipment (Face masks, gloves, sanitizers, safety helmet etc.)	Ensure the provision of PPEs to combat with Covid-19 and health and safety issues.	yearly	748,500		1,497,000	This is the tentative cost for two years period.
Sub-Total (B-2)						13,597,000	
Sub-Total B ((B-1)+(B-2))						15,325,000	Tentative for two (02) years project construction period. The cost shall be updated based on the current market prices during construction phase.
C	OPERATION & MAINTENANCE PHASE (One Year Cost)						
C-1	Environmental Monitoring Cost						
1	Water Resources/ Water Quality	Discrete grab sampling and laboratory testing of water samples by EPA approved Laboratory for monitoring.	Once	20,000	6	120,000	Biannually monitoring cost for the one year O&M Phase and will be reproduced for next years of O&M based on updated rates.
2	Noise Levels	dBA Leq. as per NEQS	Once	2,000	3	6,000	• Groundwater Samples=3
3	Ambient Air Monitoring	Monitoring of parameters as NEQS (for Vehicular emissions) & (for ambient Air and	Once	30,000	3	90,000	• Wastewater / Surface water Samples=3 • Noise Samples=3



Sr. No.	Parameter	Mechanism	Frequency	Unit Rate (PKR)	Quantity	Cost (PKRs)	Remarks
		Noise) by EPA approved Laboratory					<ul style="list-style-type: none"> Ambient Air Samples=3 Biannual monitoring cost for the one-year of operational period will be updated based on latest rates.
Sub-Total (C-1)						216,000	
C-2 Environmental and Social Management Cost (Optional)							
1	Environmental Officer	Environment Personnel will monitor / conduct all environment and HSE related activities e.g. monitoring, PPEs, housekeeping, safety signage, emergency preparedness, etc.	Monthly		300,000	3,600,000	This is the tentative monthly cost for one-year period for one senior and one junior expert along with their monthly logistics.
2	Social Officer	Monitoring of social related issues, carry out consultations with locals, Assess the resettlement implementation efficiency, effectiveness, impact and its sustainability, Status of redressal of community complaints and time spent to resolve the community grievances etc.	Monthly		250,000	3,000,000	This is the tentative monthly cost for one-year period for one senior and one junior expert along with their monthly logistics.
Sub-Total (C-2)						6,600,000	
Sub-Total C ((C-1)+(C-2))						6,816,000	Tentative for one (01) year project O&M phase, if required. The cost shall be reproduced for next years of O&M Phase and updated based on the current market prices during O&M phase, if required.
Grand Total (A+B+C)						88,624,600	
Contingency Charges			10% of Grand Total			8,862,460	
Grand Total with Contingencies						97,487,060	



8 CONCLUSION AND RECOMMENDATIONS

8.1 CONCLUSIONS

NHA intends to provide additional lanes on each side of N-5 (32 Km approximately) between Chamkani to Nowshera which will eliminate traffic problem, allow smooth traffic flow, reduce accidents, time saving and improved operating cost.

This report has been prepared in accordance with the requirements of the Khyber Pakhtunkhwa Environmental Protection Act, 2014. Khyber Pakhtunkhwa Environmental Assessment Rules, 2021, provides screening categories of projects for which IEE or EIA need to be conducted. The proposed Project falls under the Category 'D' of "Transport" of the Schedule II. This category requires an EIA study to be conducted to initiate the process of environmental approval. Thus, to fulfill the requirements, an EIA Study has been prepared for the proposed Project.

NHA's main objective is to provide a safe and congestion free high speed corridor for the commuters. It will facilitate both the locals and visitors travelling towards Peshawar and transportation of freight from Peshawar Chamkani to Nowshera will also be improved. This facility will also ease the traffic issues which will have a direct impact that is reduction in travel time and vehicle operating cost as well as indirect impact, that is, peace and reduced psychological pressure on the lives of commuters.

Significant efforts were made to identify the main physical, ecological, social, cultural and environmental issues related to the construction and operation of the proposed road. Various stakeholders including government departments and agencies were also contacted for obtaining salient information in this regard along with that from area residents. After the construction of the proposed Project, people living in the project area and the road users / travelers will get the following major benefits:

- The proposed Project shall provide an efficient / intelligent transport corridor. Main objective of this road is to provide a safe, congestion free and high speed facility to the commuters of project area and heavy traffic;
- This road will bring about further revolution in road transport and time saving journey for passengers. It will also contribute to ensure smooth and efficient movement of trade, goods and traffic in relatively shorter time;
- Development of businesses during the construction stage will cause socio-economic uplift of the locals along the project corridor. The socio-economic impacts like employment, education, living standards and cultural uplift during the interaction with locals are the indirect benefits due to the Project implementation;
- Raising of new trees on either side of the proposed road shall render a positive impact on the flora of the area and will also cause a positive impact on the landscape of the area, which shall be of permanent in nature;
- Presence of adequate flora will absorb CO₂ gas, through photosynthesis, emitted from an expected large number of cars, vehicles and public transport, thus purifying air of hazardous particles; and



- During the operation of the proposed Project, it will result in lesser fuel consumption and decrease in operating cost.

During the preconstruction and construction phases, following is the list of main issues and concerns:

- Cutting of trees/bushes falling within the proposed RoW;
- Disturbance to public utilities;
- Disturbance to the public movement and cultural norms during construction;
- Reduction in the daily routine activities of local residents during construction;
- Noise and air pollution due to the working of construction machinery during construction and traffic operation phases of the Project;
- Solid waste and wastewater generation during construction;
- Oil spillages from construction machinery, resulting in soil and groundwater contamination;
- Surface water bodies contamination due to soil erosion and construction activities; and
- Occupational and community health and safety issues.

Project is socio-economically viable and environment friendly if the EIA including EMP is implemented in true letter and spirit. Results of the EIA Study have shown that the impacts of the project activity on the physical environment will be negligible. However, there will be significant impacts on the ecological and social environment. These impacts could be reduced by proper and judicious compensation to the affectees and well-planned meticulous design of the facility and by implementing an appropriate tree plantation plan. The plantation will enhance the aesthetics; improve the landscape as well as the environmental conditions along the project area. In fact, in times of diminishing economic and natural resources, using sustainable approaches in transportation infrastructure will help us to enhance quality of life and serve the transportation needs of the present leaving provision for future generations to meet their needs.

An EMP has been developed as part of the report which provides a detailed mitigation matrix that covers impacts, mitigation measures roles and responsibilities and timings to avoid, minimize or mitigate the adverse impacts of the proposed Project.

8.2 RECOMMENDATIONS

The EIA including EMP, its mitigation and monitoring programs, contained herewith will be included within the Bidding documents for project works for all Project components. The Bidding documents will ensure that the Contractor will be responsible for the implementation of the requirements of the EMP through his own SSEMP which will adopt all of the conditions of the EMP. This ensures that all potential bidders are aware of the environmental requirements of the Project and its associated environmental costs.

The EMP and all its requirements will then be added to the Contractors Contract, thereby making implementation of the EMP a legal requirement according to the Contract. The Contractor will then prepare a SSEMP which will be approved and monitored by the Engineer. The Engineer will note any non-conformance with the SSEMP (and the EMP) the Contractor



can be held liable for breach of the contractual obligations of the EMP. To ensure compliance with the SSEMP the Contractor should employ Environmental and Social experts to monitor and report Project activities throughout the Project Construction Phase.

ANNEXES

**ANNEX-I: ENVIRONMENTAL
MONITORING REPORT**



Green Crescent
Environmental Consultants (Pvt) Ltd.



Punjab-EPA Certified
Lahore Laboratory
Federal-EPA Certified
Islamabad Laboratory

ENVIRONMENTAL MONITORING REPORT

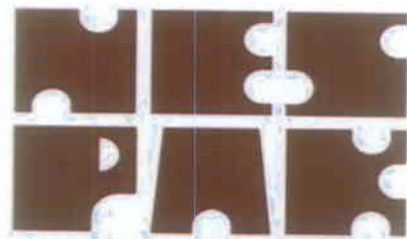
FOR

FEASIBILITY STUDY AND DETAILED DESIGN

FOR PESHAWAR (CHAMKANI TO NOSHERWA,

ADDITION OF EXTRA LANE ON EACH SIDE OF

N-5 (32KM)), PESHAWAR



NATIONAL ENGINEERING
SERVICES PAKISTAN
(PVT) LIMITED

Prepared By: Green Crescent Environmental Consultants Pvt. Ltd.

ANNEX-I

جی اے سی سی

Reference Number: GCEC-PK-154/2022

Contact Details of Client

Contact Person	Mr. Irfan-ul-Haq
Designation	VP-GT/GE DIVISION NESPAK
Contact Number	-
Fax	+92 42 9909000
Email ID	info@nespak.com.pk
Address	NESPAK House, 1-C Block-N, Model Town Extension Lahore

Contact Details of GCEC-Pakistan

Director:	Mr. Mian Khurram Usman
Telephone:	+92 42 35962885
Fax:	+92 42 35962884
Email:	manager.operations@gcec.ac
Address	House No. 368-B Block B, Canal View, Lahore

Approved By:

Zara Yousaf
Coordination Department

Table of Contents

SECTION 1: OBJECTIVES & SCOPE 5

1.1 STUDY OBJECTIVES 5

1.2 SCOPE OF SERVICES 5

1.3 MONITORING TEAM 5

2. SECTION 2: MONITORING SCHEDULE 6

3. SECTION 3: MONITORING LOCATION 7

4. SECTION 4: MONITORING & METHODOLOGY 12

4.1 ONSITE MONITORING 12

4.1.1 VANTAGE PRO2, DAVIS 12

4.1.2 DUST TRAK II AEROSOL MONITOR 8530, TSI 13

4.1.3 MODEL 407730 DIGITAL SOUND LEVEL METER, EXTECH 14

4.1.4 HORIBA 15

4.2 WATER SAMPLE COLLECTION AND PRESERVATION 16

4.2.1 DRINKING WATER SAMPLING & ANALYSIS 17

4.2.2 WASTE WATER SAMPLING & ANALYSIS 17

4.2.3 SURFACE WATER SAMPLING & ANALYSIS 17

4.3 SAMPLE TAGGING AND CHAIN OF CUSTODY 17

5. SECTION 5: RESULTS & DISCUSSIONS 18

5.1 BACKGROUND NOISE LEVEL MONITORING 18

DISCUSSION ON NOISE RESULTS 18

5.2 AMBIENT AIR QUALITY MONITORING 19

DISCUSSION OF NOX MEASUREMENTS 20

DISCUSSION OF OZONE MEASUREMENTS 22

5.3 DRINKING WATER ANALYSIS 25

DISCUSSION ON RESULTS 25

5.4 WASTE WATER ANALYSIS 29

DISCUSSION ON RESULTS 29

SECTION 6: CONCLUSION 32

List of Figures

Figure 3-1: Map Showing Ambient Air Monitoring Location (7th June 2022 to 8th June 2022)... 7
 Figure 3-2: Map Showing Ambient Air Monitoring Location (8th June 2022 to 9th June 2022) 7
 Figure 3-3: Map Showing Ambient Air Monitoring Location (9th June 2022 to 10th June 2022) 8
 Figure 3-4: Map Showing Drinking Water Sampling Location (10th June 2022) 8
 Figure 3-5: Map Showing Drinking Water Sampling Location (10th June 2022) 9
 Figure 3-6: Map Showing Drinking Water Sampling Location (10th June 2022) 9
 Figure 3-7: Map Showing Waste Water Sampling Locations (10th June 2022) 10
 Figure 3-8: Map Showing Waste Water Sampling Locations (10th June 2022) 10
 Figure 3-9: Map Showing Surface Water Sampling Locations (10th June 2022) 11
 Figure 4-1: View of Davis Vintage Pro at Site..... 13
 Figure 4-2: DustTrak II aerosol monitor 8530..... 14
 Figure 4-3: View of Digital Sound Level Meter 14
 Figure 4-4: HORIBA..... 15
 Figure 5-1: Day Time Average Noise Level Value Compared with Respective NEQS (7th June. to 10th June.2022)..... 19
 Figure 5-2: Night Time Average Noise Level Value Compared with Respective NEQS (7th June. to 10th June.2022)..... 19
 Figure 5-3: Daily Average NOx Measurements Compared with Respective NEQS (7th June. to 10th June.2022) 20
 Figure 5-4: Daily Average SO2 Measurement Compared with Respective NEQS (7th June. to 10th June.2022) 21
 Figure 5-5: Daily Average CO Measurement Compared with Respective NEQS (7th June. to 10th June.2022) 21
 Figure 5-6: Daily Average Ozone Measurement Compared with Respective NEQS (7th June. to 10th June.2022) 22
 Figure 5-7: Daily Average Lead Measurement Compared with Respective NEQS (7th June. to 10th June.2022) 23
 Figure 5-8: Daily Average SPM Measurements Compared with Respective NEQS ((7th June. to 10th June.2022) 23

List of Table

Table 1-1: Monitoring Team5
 Table 2-1: Monitoring Schedule6
 Table 5-1: Summary of Ambient Air Quality Monitoring Results 24
 Table 5-2: Summary of Drinking Water Analysis Results 26
 Table 5-3: Summary of Drinking Water Analysis Results 27
 Table 5-4: Summary of Drinking Water Analysis Results 28
 Table 5-5: Summary of Waste Water Analysis Results..... 30
 Table 5-6: Summary of Surface Water Analysis Results 31

ANNEX-I

ANNEX I (Draft)
STATE WATER CONTROL BOARD

Reference Number: GCEC-PK-154/2022

List of Annexures

Annex-1: Monitoring & Analysis Results.....i

DRAFT

ANNEX-I

City of Crescent
Environmental Health Services Division

Reference Number: GCEC-PK-154/2022

LIST OF ABBREVIATIONS

AA	Ambient Air
DW	Drinking Water
WW	Waste Water
SW	Surface Water
SPL	Sound Pressure Level
dB	Decibels
mg/m ³	Milligram per Cubic meter
mg/l	Milligram per Liter
µg/m ³	Micrograms per Cubic Meter
CO	Carbon Monoxide
SO ₂	Sulfur Dioxide
NO _x	Oxides of nitrogen
O ₂	Oxygen
SPM	Suspended Particulate Matter
LDL	Lowest Detection Limit
NEQS	National Environmental Quality Standards
FAO	Food and Agriculture Organization Standards
LOR	Limit of Reporting
PM	Particulate Matter
SOPs	Standard Operating Procedures
TSS	Total Suspended Solids
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association

SECTION 1: OBJECTIVES & SCOPE

1.1 STUDY OBJECTIVES

Followings were the main objectives of the study:

- To assess the current conditions of the environment in the surroundings of project area.
- To help the consultant and contractor to develop the strategies for the protection and betterment of environment.

1.2 SCOPE OF SERVICES

Scope of services covered following main components:

- Ambient Air Quality Monitoring
- Meteorological Monitoring
- Noise Level Monitoring
- Drinking Water Sampling & Analysis
- Waste Water Sampling & Analysis
- Surface Water Sampling & Analysis

1.3 MONITORING TEAM

Monitoring team of Green Crescent Environmental Consultants involved in the monitoring and sampling is given in below table:

Table 1-1: Monitoring Team

Sr. No.	Name of The Employee	Designation
1.	Mr. Mohsin Raza	Executive Field Officer

SECTION 2: MONITORING SCHEDULE

Detailed Environmental monitoring was conducted at the mutually agreed sites of project area. The monitoring and sampling was conducted from 7th June, 2022 to 10th June, 2022.

Table 2-1: Monitoring Schedule

Sr. #	Intervention Date	Activity	Monitoring Location
1.	7-06-2022 to 10-06-2022	<ul style="list-style-type: none"> • Ambient Air Quality Monitoring • Noise Level Monitoring • Meteorological Monitoring 	<ul style="list-style-type: none"> • Near Makkah Medical Center • Near Nasir Pur Railway Station • Near Askari Pump
2.	10-06-2022	<ul style="list-style-type: none"> • Drinking Water 	<ul style="list-style-type: none"> • Attock Pump Amangarh Village • Maqbol Property Dealer, Pabbi • Taru Jabba Kabab Centre, Taru Jabba
3.	10-06-2022	<ul style="list-style-type: none"> • Waste Water 	<ul style="list-style-type: none"> • Near Attock Pump, Amangarh • Drain Near HPT3 Mosque
4.	10-06-2022	<ul style="list-style-type: none"> • Surface Water 	<ul style="list-style-type: none"> • Canal Tarnab, Peshawar

SECTION 3: MONITORING LOCATION

Monitoring and Sampling Locations are as per shown in the following figure.



Figure 3-1: Map Showing Ambient Air Monitoring Location (7th June 2022 to 8th June 2022)



Figure 3-2: Map Showing Ambient Air Monitoring Location (8th June 2022 to 9th June 2022)



Figure 3-3: Map Showing Ambient Air Monitoring Location (9th June 2022 to 10th June 2022)



Figure 3-4: Map Showing Drinking Water Sampling Location (10th June 2022)



Figure 3-5: Map Showing Drinking Water Sampling Location (10th June 2022)



Figure 3-6: Map Showing Drinking Water Sampling Location (10th June 2022)



Figure 3-7: Map Showing Waste Water Sampling Locations (10th June 2022)



Figure 3-8: Map Showing Waste Water Sampling Locations (10th June 2022)



Figure 3-9: Map Showing Surface Water Sampling Locations (10th June 2022)

SECTION 4: MONITORING & METHODOLOGY

Following is a brief description of the methodology adopted for this Environmental Monitoring, including Ambient Air, Metrological Data, Noise and Water Analysis:

4.1 Onsite Monitoring

Among the environmental parameters selected by the client;

- Ambient Air
- Temperature and pH of water samples

Were monitored onsite. Ambient air monitoring including metrological monitoring and noise level monitoring was conducted using portable digital instruments while temperature and pH of the water samples were monitored manually using thermometer and pH strips. A brief description of each digital instrument used for onsite monitoring is given below;

4.1.1 Vantage Pro2, Davis

The Davis 6152 Wireless Vantage Pro2 Weather Station which was made in 2018 in America which consists of a console unit and an innovative integrated sensor suite that includes a rain collector with self-emptying bucket, temperature and humidity sensors and an anemometer. The sensor suite is housed inside a radiation shield, protecting the sensors against solar radiation and additional sources of reflected and/or radiated heat. It provides accurate weather data in a sophisticated yet easy-to-read format. With Wireless Vantage Pro2 Weather Station we can continuously measure metrological parameters including;

- Temperature
- Wind Direction
- Wind Velocity
- Humidity

- Atmospheric Pressure

Davis wireless weather station Vantage Pro2 was used for the assessment of these parameters according to standard operating procedures and obtained results are presented in **Annex-1** of this report.



Figure 4-1: View of Davis Vantage Pro at Site

4.1.2 Dust Trak II Aerosol Monitor 8530, TSI

The Dust Trak II Aerosol Monitor 8530 is a desktop battery-operated, data-logging, light-scattering laser photometer which was manufactured in 2014, that gives you real-time aerosol mass readings.

It uses a sheath air system that isolates the aerosol in the optics chamber to keep the optics clean for improved reliability and low maintenance. Using this instrument, lead and particulate matters were monitored including;

- Lead
- PM₁₀
- PM_{2.5}
- SPM



Figure 4-2: DustTrak II aerosol monitor 8530

4.1.3 Model 407730 Digital Sound Level Meter, Extech

It is a noise measuring instrument used to assess sound levels by measuring sound pressure. Often referred to as a sound pressure level (SPL) meter, decibel (dB) meter, noise meter or noise dosimeter, a sound level meter uses a microphone to capture sound. The sound is then evaluated within the device and acoustic measurement values are displayed. The most common unit of acoustic measurement for sound is the decibel (dBA). Hourly noise level monitoring was done for 24 hours at each point of selected location. Digital Sound meter was manufactured in 2014.

Noise level using portable digital sound meter was monitored at client's mutually agreed sampling points. Noise level measurement was performed according to standard operating procedures and obtained results are presented in Annex-1 of this report.



Figure 4-3: View of Digital Sound Level Meter

4.1.4 HORIBA

HORIBA, was manufactured in 2017, a Japanese brand which consists of ambient air analyzers and sampling systems for the measurement of regulatory pollutants and air quality control. It offers complete tailored or individual air quality monitoring solutions, in order to meet the requirements and regulatory needs of environmental monitoring.



Figure 4-4: HORIBA

4.1.4.1 AC32M. NITROGEN OXIDES ANALYZER (NO, NOX, NO2)

Chemiluminescence technology based, TÜV & US EPA approved. It is single chambered chemiluminescence technology with ultra-compact and lightweight – rackable 19"/3U. On board web server compatible with any internet browser and user interface with on-line help for the display, configuration, maintenance, diagnostics or software updating of the analyzer, remotely. It is capable to detect low levels of nitrogen oxides (NO-NO₂-NO_x) with standard ranges: 0-0.1/0.2/0.5/1.0 ppm

4.1.4.2 AF22E. NEW E-SERIES SO₂ ANALYZER

UV Fluorescent sulfur dioxide analyzer AF22e, TUV certified and US-EPA approved for compliance with ISO 10498, 2008/50/EC, en 14212, EN 15267, 40 CFR part 53 SUB B and SUB C.

It is a light weight eco-friendly & eco-innovative conception unit which detects early signs of trouble, allows predictive maintenance, identifies the service needed and guides the service operations step by step.

It provides real-time calibration graph, animated synoptic, auto-diagnostic, control and maintenance data screens can be displayed while the instrument is operating. It provides superior metrological presentations for SO₂ measurements in the range as low as 0.05 ppm F.S.

4.1.4.3 CO12E. NEW E-SERIES CO ANALYZER

Non dispersive Infra-Red carbon monoxide analyzer CO12e, TUV certified and US-EPA approved for compliance with ISO 4224, EN 14626, EN 15267, 40 CFR part 53 SUB B and SUB C.

It is a light weight eco-friendly & eco-innovative conception unit with breakthrough mechanical design for weight and power saving as well as thermal insulation & reliability. It has automatic or programmable response time adjustment, ensuring efficient monitoring of low concentration levels of carbon monoxide. It provides superior metrological presentations for CO measurements in the range 0-100 ppm.

4.2 Water Sample Collection and Preservation

Water samples were collected from mutually agreed sampling point according to the SOPs based on American Public Health Association (APHA) for water sampling and analysis. Decontaminated glass bottles were used to collect the samples. To prevent air bubbles from being trapped in the bottles, they were filled to the brim. The lid of the sampling bottles were then replaced tightly. The bottles were then labeled and chain of custody forms were filled out and signed to keep track of the collected samples. Collected samples were then preserved in appropriate container as per APHA Preservation Guidelines. A shipping container containing ice packs with maintained temperature was used for transporting the samples from sampling location to GCHC Lahore Branch for testing.

4.2.1 Drinking Water Sampling & Analysis

Sampling for drinking water was carried out at mutually agreed sampling point. Physical and chemical parameters were analyzed afterwards in GCFC labs for drinking water sample. Analytical methods used during the laboratory testing were in line with the American Public Health Association's Standard Methods for the Examination of Water. Analysis Results are presented in **Annex 1** of this report.

4.2.2 Waste Water Sampling & Analysis

Sampling for waste water were carried out at mutually agreed sampling points. Physical and chemical parameters were analyzed afterwards in GCFC labs for waste water samples. Analytical methods used during the laboratory testing were in line with the American Public Health Association's Standard Methods for the Examination of Water. Analysis Results are presented in **Annex 1** of this report.

4.2.3 Surface Water Sampling & Analysis

Sampling for surface water was carried out at mutually agreed sampling point. Physical and chemical parameters were analyzed afterwards in GCFC labs for surface water sample. Analytical methods used during the laboratory testing were in line with the American Public Health Association's Standard Methods for the Examination of Water. Analysis Results are presented in **Annex 1** of this report.

4.3 Sample Tagging and Chain of Custody

In GCFC Lahore Branch, samples and chain of custody form were handed over by Field Monitoring to the Coordination Staff for in-house tagging and logging according to the company's policy and handed over to the Laboratory Staff for further physical, chemical and microbiological testing. A brief description of each sampling type and further proceedings are also discussed in following section.

SECTION 5: RESULTS & DISCUSSIONS

This section of the report presents the Environmental testing results of noise-level monitoring, ambient air quality, waste water, drinking water & surface water analysis.

5.1 Background Noise Level Monitoring

The Noise monitoring activity was carried at the project site and at the surrounding areas of project site. Monitoring schedule is presented in Table 2-1. While a brief description of monitoring session is as below.

Hourly noise monitoring was conducted at 03rd selected locations. The results of monitoring location was compared with commercial noise standards for National Environmental Quality Standards i.e., 65.0 dB (A) for Day Time and 55.0 dB (A) for Night Time.

Discussion on Noise Results

Noise level Monitoring was conducted at selected monitoring location on 24 hour basis. The monitoring results of the site are complying well with the commercial noise standards of NEQS. Day and Night Time averages for monitoring point are presented in figures below.

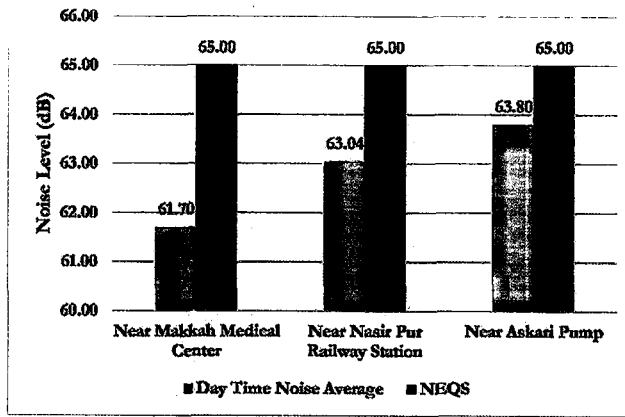


Figure 5-1: Day Time Average Noise Level Value Compared with Respective NEQS (7th June. to 10th June.2022)

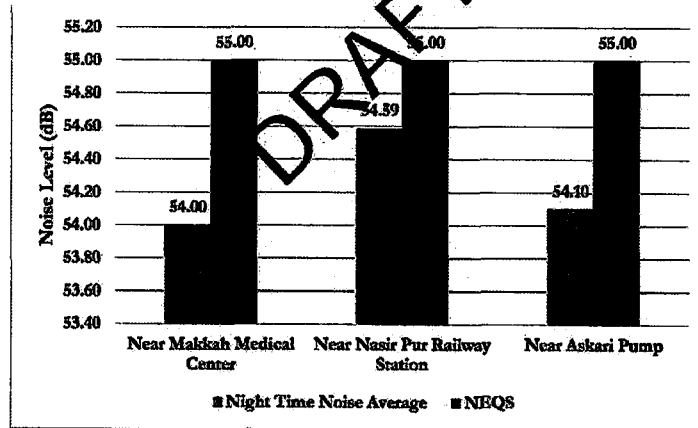


Figure 5-2: Night Time Average Noise Level Value Compared with Respective NEQS (7th June. to 10th June.2022)

5.2 Ambient Air Quality Monitoring

The activity for monitoring the ambient air conditions was carried out at the project site and its vicinity for 24 hours, starting from 7th June. to 10th June.2022. To assess the current quality of ambient air, Carbon Monoxide, Oxides of Nitrogen, Sulphur Dioxide, Ozone, and Particulate

Matter were monitored. Summary of monitoring results is presented in Table 5-1. Detailed result reports are also attached as Annex 1.

Discussion of NOx Measurements

The readings of NO, NO₂ and NO_x for the project site and its surroundings comply with the National Environmental Quality Standards i.e., 40 µg/m³, 80 µg/m³ and 120 µg/m³ respectively. Sum of NO and NO₂ is termed as NO_x. NO_x results found at all monitoring locations were within the NEQS limits. Monitoring results, compared with NEQS, are graphically presented in figure below and in Summary Table 5-1.

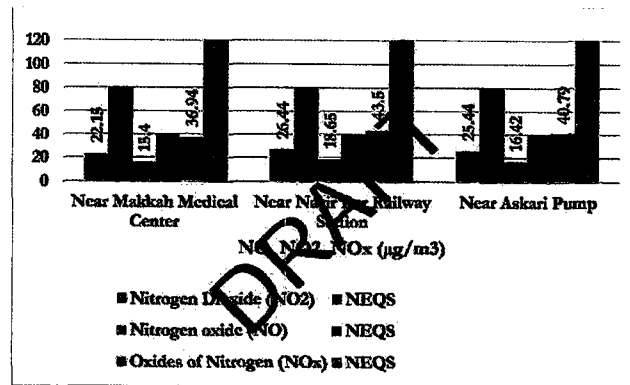


Figure 5-3: Daily Average NOx Measurements Compared with Respective NEQS (7th June. to 10th June.2022)

Discussion of SO₂ Measurements

The SO₂ readings for all the monitoring locations are presented in the summary table which depicts that the monitoring results are within the prescribed limits of NEQS i.e. 120 µg/m³. SO₂ results found at monitoring location were within the NEQS limits. Monitoring results, compared with NEQS, are also graphically presented in figure below and in Summary Table 5-1.

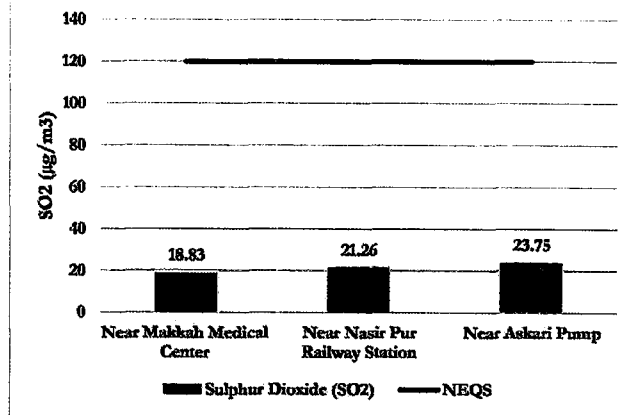


Figure 5-4: Daily Average SO₂ Measurement Compared with Respective NEQS (7th June. to 10th June.2022)

Discussion of CO Measurements

Carbon Monoxide (CO) was monitored for 24 hours at monitoring locations & their values were within the permissible limit of NEQS i.e., 5.0 mg/m³. Monitoring results, compared with NEQS, are graphically presented in figure below and in Summary Table 5-1.

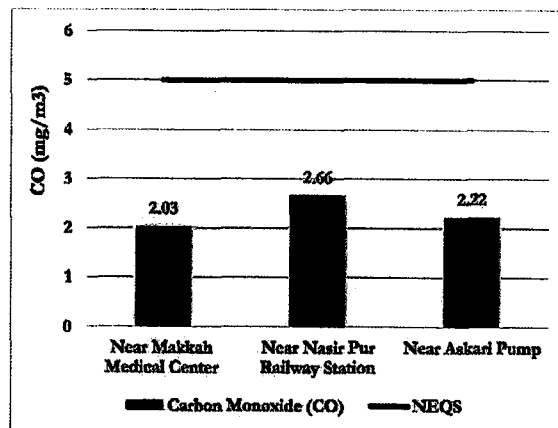


Figure 5-5: Daily Average CO Measurement Compared with Respective NEQS (7th June. to 10th June.2022)

Discussion of Ozone Measurements

Ozone (O₃) was monitored for 24 hours at monitoring location and the value detected at location is within the permissible limit of NEQS i.e., 130.0 µg/m³. Monitoring results, compared with NEQS, are graphically presented in figure below and in Summary Table 5-1.

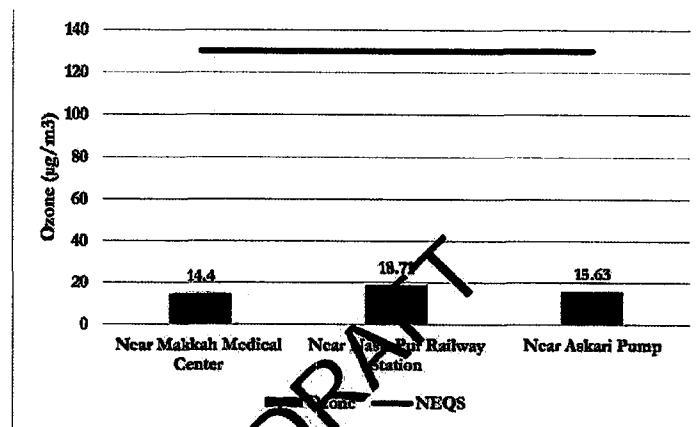


Figure 5-6: Daily Average Ozone Measurement Compared with Respective NEQS (7th June. to 10th June.2022)

Discussion of Lead Measurements

Lead was monitored for 24 hours at monitoring location and the value detected at selected location is within the permissible limit of NEQS i.e., 1.50 µg/m³. Monitoring results, compared with NEQS, are graphically presented in figure below and in Summary Table 5-1.

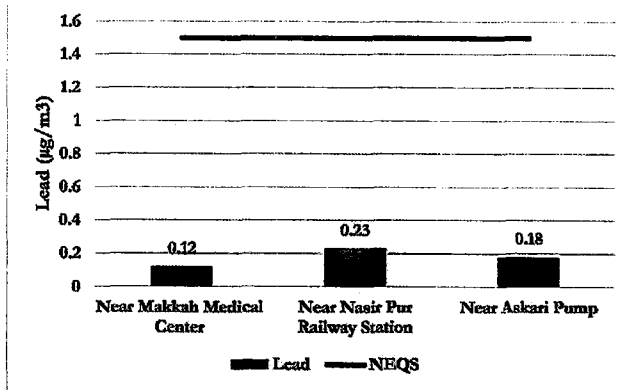


Figure 5-7: Daily Average Lead Measurement Compared with Respective NEQS (7th June. to 10th June.2022)

Discussion on Suspended Particulate Matter (SPM)

The readings of PM₁₀, PM_{2.5} and SPM for the project site and its surroundings are compared with the National Environmental Quality Standard i.e., 150 µg/m³, 35 µg/m³ and 500 µg/m³ respectively. Suspended Particulate Matter (SPM) is the sum of PM₁₀ and PM_{2.5}. All of the measured PM were found falling within the prescribed limits of NEQS. Monitoring results, compared with NEQS, are graphically presented in figure below and in Summary Table 5-1.

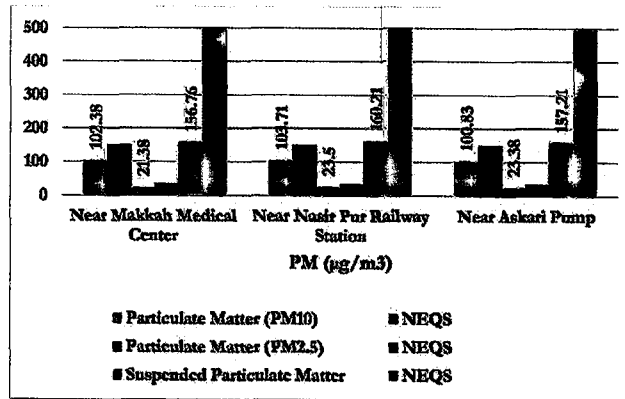


Figure 5-8: Daily Average SPM Measurements Compared with Respective NEQS ((7th June. to 10th June.2022)

ANNEX-I

City of Islamabad
 Environmental Department
 Environmental Quality Control Division

Reference Number: GCI/C-PK-154/2022

Table 5-1: Summary of Ambient Air Quality Monitoring Results

Location Identification			
Monitoring Site:	01	02	03
Monitoring Location:	Near Makkah Medical Center	Near Nasir Pur Railway Station	Near Askari Pump
Date:	07 June 2022 to 08 June 2022	08 June 2022 to 09 June 2022	09 June 2022 to 10 June 2022
Coordinates:	34°00'51.3"N 71°45'29.7"E	34°01'05.9"N 71°40'40.4"E	34°00'37.4"N 71°53'59.7"E

Parameter	Unit	Duration	Average obtained Concentration			NEQS
			01	02	03	
Nitrogen Dioxide (NO ₂)	µg/m ³	24 hours	22.15	26.44	25.44	80.0
Nitrogen oxide (NO)	µg/m ³	24 hours	15.40	18.65	16.42	40.0
NO _x	µg/m ³	24 hours	36.94	43.50	40.79	120.0
Sulphur Dioxide (SO ₂)	µg/m ³	24 hours	18.83	21.26	23.75	120.0
Carbon Monoxide (CO)	mg/m ³	24 hours	2.03	2.66	2.22	05.0*
Ozone (O ₃)	µg/m ³	24 hours	14.40	18.71	15.63	130.0**
Particulate Matter (PM ₁₀)	µg/m ³	24 hours	102.38	103.71	100.83	150.0
Particulate Matter (PM _{2.5})	µg/m ³	24 hours	21.38	23.50	23.38	35.0
Suspended Particulate Matter (SPM)	µg/m ³	24 hours	156.76	160.21	157.21	500.0
Lead Airborne Particles	µg/m ³	24 hours	0.12	0.23	0.18	1.5

Abbreviations:

NEQS= National Environmental Quality Standards
 (*08 hour standard for CO)
 (**01 hour standard for O₃)
 µg/m³= Micrograms per Cubic Meter
 mg/m³= Milligrams per Cubic Meter
Remarks: All parameters are in compliance with NEQS.

5.3 Drinking Water Analysis

Drinking water samples were collected from 03 locations on 10-06-2022 which were preserved and submitted in GCEC-Laboratory according to the standard methods. Summary of Analysis Results are given below in Table 5-2.

Discussion on Results

The laboratory test results of drinking water are summarized in the table below. It is obvious from the analysis results that all the physical and chemical parameters of drinking water of the project site meets the permissible limits of National Environmental Quality Standards.

In the light of the above discussion of test results, it is concluded that all drinking water samples are in compliance with the permissible limits of National Environmental Quality Standards.

ANNEX-I

Project: GCEC

Reference Number: GCEC-PK-154/2022

Table 5-2: Summary of Drinking Water Analysis Results

Sample Marking & Identification					
01	Attock Pump Amangarh Village	Sampling Coordinates	34°00'36.6"N 71°55'54.5"E		
Parameters	Analysis Method	Unit	LOR	Result 01	NEQS
PHYSICAL & CHEMICAL ANALYSIS					
pH**	APHA-4500H ⁺ B	-	0.01	7.17	6.5-8.5
Odor	In-house	-	-	Odorless	Non-Objectionable
Taste	In house	-	-	Sweet	Non Objectionable
Color	APHA 2130 B/C	Pt/Co	1.0	<1.0	≤15 TCU
Turbidity**	APHA 2130 B	NTU	-	ND	<5 NTU
Total Hardness**	APHA-2340 B & C	mg/l	0.1	344.0	< 500 mg/l
Total Dissolved Solid (TDS)**	APHA-2540 C	mg/l	1.0	838.0	< 1000
Ammonia	APHA-4500-NH ₃ -B	mg/l	0.002	<0.002	-
Chloride**	APHA-4500 B	mg/l	0.24	77.97	< 250
Cyanide (CN)	APHA-4500CN E	mg/l	0.01	<0.01	≤ 0.05
Fluoride (F)**	APHA-4500F D	mg/l	0.01	<0.01	≤ 1.5
Nitrite	APHA 4500NO ₂ B	mg/l	0.01	<0.01	≤ 3 (P)
Nitrate**	APHA 4500NO ₃ C	mg/l	0.1	2.2	≤ 50
Phenolic Compound	APHA-5530 D	mg/l	0.01	<0.01	-
Residual Chlorine	APHA-4500Cl G	mg/l	0.1	<0.1	0.2-0.5
Aluminum (Al)	APHA-3111Al B	mg/l	0.028	<0.028	≤ 0.2
Cadmium**	APHA 3111 B	mg/l	0.0028	<0.0028	0.01
Copper**	APHA-3111 B	mg/l	0.0045	<0.0045	2
Chromium**	APHA-3111 B	mg/l	0.0054	<0.0054	≤ 0.05 (P)
Mercury	APHA-3112Hg B	mg/l	0.0008	<0.0008	≤ 0.001
Antimony (Sb)**	APHA-3111 B	mg/l	-	ND	≤ 0.005 (P)
Nickel**	APHA 3111 C	mg/l	0.008	<0.008	≤ 0.02
Zinc**	APHA 3111 B	mg/l	0.0033	<0.0033	5.0
Arsenic	APHA-3111As B	mg/l	0.01	<0.01	≤ 0.05 (P)
Barium	APHA-3111Ba B	mg/l	0.031	<0.031	0.7
Manganese**	APHA-3111 B	mg/l	0.0016	<0.0016	≤ 0.5
Iron**	APHA-3111 B	mg/l	0.1	<0.1	-
Boron	APHA 4500 B (C)	mg/l	0.1	<0.1	0.3
Lead**	APHA-3111 B	mg/l	0.013	<0.013	≤ 0.05
Selenium	APHA-3111Se B	mg/l	-	ND	0.01 (P)
MICROBIOLOGICAL ANALYSIS					
Total Coliforms	APHA-9222 B	CFU/100ml	-	Absent	0/100ml
Faecal Coliforms (Ecoli)	APHA-9222 D	CFU/100ml	-	Absent	0/100ml
Abbreviations:					
ND: Not Detected		LOR: Limit of Reporting		NEQS: National Environmental Quality Standards	
Note:					
* Uncertainty of all the parameters and laboratory conditions at the time of analysis will be provided as per client's requirement. The lab environmental conditions are maintained at 25±5°C and humidity at 50±20%. Remarks: All parameters are in compliance with NEQS.					
Disclaimer: The results are solely of the sample provided. ** All the starred parameters are PNAAC accredited.					

ANNEX-I

Reference Number: GCEC-PK-154/2022

Table 5-3: Summary of Drinking Water Analysis Results

Sample Marking & Identification					
02	Maqbol Property Dealer, Pabli	Sample Coordinates	34°00'34.3"N 71°47'43.7"E		
Parameters	Analysis Method	Unit	LOR	Result	NEQS
				02	
PHYSICAL & CHEMICAL ANALYSIS					
pH**	APHA 4500 F* B		0.01	7.25	6.5-8.5
Odor	In-house			Odorless	Non-Objectionable
Taste	In-house			Sweet	Non-Objectionable
Color	APHA-2120 B/C	Pt/Co	1.0	<1.0	≤15 TCU
Turbidity**	APHA-2130 B	NTU		ND	<5 NTU
Total Hardness**	APHA-2340 B & C	mg/l	0.1	276.0	< 500 mg/l
Total Dissolved Solid (TDS)**	APHA-2540 C	mg/l	1.0	854.0	< 1000
Ammonia*	APHA-4500-NH ₃ -B	mg/l	0.002	<0.002	-
Chloride**	APHA-4500 B	mg/l	0.24	67.97	< 250
Cyanide (CN)	APHA-4500CN F	mg/l	0.01	<0.01	≤ 0.05
Fluoride (F)**	APHA-4500F* D	mg/l	0.01	<0.01	≤ 1.5
Nitrite	APHA-4500NO ₂ B	mg/l	0.01	<0.01	≤ 3 (P)
Nitrate**	APHA 4500NO ₃ C	mg/l	0.1	<0.1	≤ 50
Phenolic Compound	APHA-5530 D	mg/l	0.01	<0.01	-
Residual Chlorine	APHA-4500Cl G	mg/l	0.1	<0.1	0.2-0.5
Aluminum (Al)	APHA-3111Al B	mg/l	0.028	<0.028	≤ 0.2
Cadmium**	APHA-3111 B	mg/l	0.0028	<0.0028	0.01
Copper**	APHA-3111 B	mg/l	0.0045	<0.0045	2
Chromium**	APHA 3111 B	mg/l	0.0054	<0.0054	≤ 0.05 (P)
Mercury	APHA-3112Hg B	mg/l	0.0008	<0.0008	≤ 0.001
Antimony (Sb)**	APHA-3111 B	mg/l	-	ND	≤ 0.005 (P)
Nickel**	APHA-3111 C	mg/l	0.008	<0.008	≤ 0.02
Zinc**	APHA-3111 B	mg/l	0.0033	<0.0033	5.0
Arsenic	APHA-3111As B	mg/l	0.01	<0.01	≤ 0.05 (P)
Barium	APHA-3111Ba B	mg/l	0.031	<0.031	0.7
Manganese**	APHA-3111 B	mg/l	0.0016	<0.0016	≤ 0.5
Iron**	APHA-3111 B	mg/l	0.1	<0.1	-
Boron	APHA-4500-B (C)	mg/l	0.1	<0.1	0.3
Lead**	APHA-3111 B	mg/l	0.013	<0.013	≤ 0.05
Selenium	APHA-3111Se B	mg/l	-	ND	0.01 (P)
MICROBIOLOGICAL ANALYSIS					
Total Coliforms	APHA-9222 B	CFU/100ml		Absent	0/100ml
Faecal Coliforms (Ecoli)	APHA-9222 D	CFU/100ml		Absent	0/100ml
Abbreviations:					
ND: Not Detected		LOR: Limit of Reporting		NEQS: National Environmental Quality Standards	
Note:					
* Uncertainty of all the parameters and laboratory conditions at the time of analysis will be provided as per client's requirement. The lab environmental conditions are maintained at 25±5°C and humidity at 50±20%. Remarks: All parameters are in compliance with NEQS.					
Disclaimer: The results are solely of the samples provided. ** All the starred parameters are P.N.A.C. accredited.					

ANNEX-I

QSWAT 14 1900
 (Sample Name and Date)

Reference Number: GCEC-PK-154/2022

Table 5-4: Summary of Drinking Water Analysis Results

Sample Marking & Identification					
03	Taru Jabba Kahab Centre, Taru Jabba	Sample Coordinates	34°00'56.1"N 71°43'29.7"E		
Parameters	Analysis Method	Unit	LOR	Result	NEQS
				03	
PHYSICAL & CHEMICAL ANALYSIS					
pH**	APHA-45001* B	-	0.01	7.23	6.5-8.5
Odor	In-house	-	-	Odorless	Non-Objectionable
Taste	In-house	-	-	Sweet	Non-Objectionable
Color	APHA-2120 B/C	Pt/Co	1.0	<1.0	≤15 TCU
Turbidity**	APHA 2130 B	NTU	-	ND	<5 NTU
Total Hardness**	APHA-2340 B & C	mg/l	0.1	364.0	< 500 mg/l
Total Dissolved Solid (TDS)**	APHA-2540 C	mg/l	1.0	776.0	< 1000
Ammonia	APHA-4500-NH ₃ B	mg/l	0.002	<0.002	-
Chloride**	APHA-4500 B	mg/l	0.24	47.98	< 250
Cyanide (CN)	APHA-4500CN E	mg/l	0.01	<0.01	≤ 0.05
Fluoride (F)**	APHA-4500F D	mg/l	0.01	<0.01	≤ 1.5
Nitrite	APHA-4500NO ₂ B	mg/l	0.01	<0.01	≤ 3 (P)
Nitrate**	APHA-4500NO ₃ C	mg/l	0.1	<0.1	≤ 50
Phenolic Compound	APHA-5530 D	mg/l	0.01	<0.01	-
Residual Chlorine	APHA-4500Cl G	mg/l	0.1	<0.1	0.2-0.5
Aluminum (Al)	APHA 3111Al B	mg/l	0.028	<0.028	≤ 0.2
Cadmium**	APHA 3111 B	mg/l	0.0028	<0.0028	0.01
Copper**	APHA-3111 B	mg/l	0.0045	<0.0045	2
Chromium**	APHA-3111 B	mg/l	0.0054	<0.0054	≤ 0.05 (P)
Mercury	APHA-3112Hg B	mg/l	0.0008	<0.0008	≤ 0.001
Antimony (Sb)**	APHA-3111 B	mg/l	-	ND	≤ 0.005 (P)
Nickel**	APHA-3111 C	mg/l	0.008	<0.008	≤ 0.02
Zinc**	APHA-3111 B	mg/l	0.0033	<0.0033	5.0
Arsenic	APHA 3111As B	mg/l	0.01	<0.01	≤ 0.05 (P)
Barium	APHA-3111Ba B	mg/l	0.031	<0.031	0.7
Manganese**	APHA-3111 B	mg/l	0.0016	<0.0016	≤ 0.5
Iron**	APHA-3111 B	mg/l	0.1	<0.1	-
Boron	APHA-4500-B (C)	mg/l	0.1	<0.1	0.3
Lead**	APHA-3111 B	mg/l	0.013	<0.013	≤ 0.05
Selenium	APHA-3111Se B	mg/l	-	ND	0.01 (P)
MICROBIOLOGICAL ANALYSIS					
Total Coliforms	APHA-9222 B	CFU/100ml	-	Absent	0/100ml
Faecal Coliforms (Ecoli)	APHA-9222 D	CFU/100ml	-	Absent	0/100ml
Abbreviations:					
ND: Not Detected		LOR: Limit of Reporting		NEQS: National Environmental Quality Standards	
Note:					
*Uncertainty of all the parameters and laboratory conditions at the time of analysis will be provided as per client's requirement. The lab environmental conditions are maintained at 25±5°C and humidity at 50±20%. Remarks: All parameters are in compliance with NEQS.					
Disclaimer: The results are solely of the sample provided. **All the starred parameters are PNC accredited.					

5.4 Waste Water Analysis

Waste Water sample were collected from 2 locations on 10-06-2022 which were preserved and submitted in GCEC-Laboratory according to the standard methods. Summary of Analysis Results are given below in Table 5-5.

Discussion on Results

The laboratory test results of waste water are summarized in the table below. It is obvious from the analysis results that the waste water of the project site meets the permissible limits of National Environmental Quality Standards for all tested parameters.

In the light of the above discussion of the liquid effluent test results, it is concluded that waste waters samples are in compliance with the permissible limits of National Environmental Quality Standards.

DRAFT

ANNEX-I

Reference Number: GCEC-PK-154/2022

Table 5-5: Summary of Waste Water Analysis Results

Sample Marking & Identification			
01	Near Attock Pump, Amangash	Sampling Coordinates	34°00'38.4"N 71°53'53.6"E
02	Drain Near IPT3 Mosque	Sampling Coordinates	34°00'36.7"N 71°53'55.1"E

Parameters	Analysis Method	Unit	LOR	Result		NEQS
				01	02	
PHYSICAL & CHEMICAL ANALYSIS						
Temperature	APIA 2550 B	°C	-	2.6	2.5	≤3
pH**	APHA-4500-H B	pH unit	0.01	6.9	6.98	6-9
Total Dissolved Solid (TDS)**	APHA-2540 C	mg/l	1.0	654.0	739.0	3500
Oil and Grease**	USEPA-1664	mg/l	0.2	<0.2	<0.2	10
Biological Oxygen Demand	APIA 5210 B	mg/l	1.0	12.4	14.2	80
Chemical Oxygen Demand**	APHA-5220-D	mg/l	1.0	42.0	47.0	150
Total Suspended Solid**	APHA-2540-C	mg/l	1.0	85.0	103.0	200
Phenolic Compound	APIA 5530 D	mg/l	0.01	0.08	0.07	0.1
Chloride (Cl)**	APIA-4500 B	mg/l	0.2	67.97	67.97	1000
Fluoride (F)**	APIA-4500F D	mg/l	0.01	<0.01	<0.01	10
Cyanide (CN)	APHA-4500CN E	mg/l	0.01	<0.01	<0.01	1.0
Detergent	APHA-5540 C	mg/l	-	ND	ND	20
Sulphate**	APIA-4500-SO ₄ ²⁻ C	mg/l	0.41	59.68	63.79	600
Sulphide	APIA-4500 S ₂ F	mg/l	0.2	<0.2	<0.2	1.0
Ammonia	APIA-4500-NH ₃ -B,C	mg/l	0.002	14.3	12.1	40
Silver	APIA 3500 Ag B	mg/l	0.0032	<0.0032	<0.0032	1.0
Cadmium**	APHA-3111 B	mg/l	0.0028	<0.0028	<0.0028	0.1
Chromium**	APHA-3111 B	mg/l	0.0054	<0.0054	<0.0054	1.0
Copper**	APIA 3111 B	mg/l	0.0045	<0.0045	<0.0045	1.0
Lead**	APIA-3111 B	mg/l	0.013	<0.013	<0.013	0.5
Mercury	APIA-3500-Ig B	mg/l	0.0008	<0.0008	<0.0008	0.01
Nickel**	APHA-3111 C	mg/l	0.008	<0.008	<0.008	1.0
Zinc**	APHA-3111 B	mg/l	0.0033	<0.0033	<0.0033	5.0
Arsenic	APIA 3500As B	mg/l	0.01	0.01	0.01	1.0
Barium	APIA-3500Ba B	mg/l	0.031	<0.031	<0.031	1.5
Manganese**	APHA-3111 B	mg/l	0.0016	<0.0016	<0.0016	1.5
Iron**	APHA-3111 B	mg/l	0.1	1.2	1.5	8.0
Boron	APIA 4500B C	mg/l	0.1	<0.1	<0.1	6.0
Total Chlorine	APIA-4500CL-B	mg/l	0.1	<0.1	<0.1	1.0
Selenium	APHA-3500Sc C	mg/l	-	ND	ND	0.5
Pesticides	APHA-6630 B	mg/l	-	ND	ND	0.15
Total Toxic Metals	-	mg/l	-	0.01	0.01	2

Abbreviations:

ND: Not Detected

LOR: Limit of Reporting

NEQS: National Environmental Quality Standards

Note:

* Uncertainty of all the parameters and laboratory conditions at the time of analysis will be provided as per client's requirement. The lab environmental conditions are maintained at 25±5°C and humidity of 50±20%. Remarks: All parameters are in compliance with NEQS.

Disclaimer: The results are solely of the sample provided. **All the starred parameters are PNC-AC, accredited.

ANNEX-I

Water District
 District, Peshawar, Pakistan

Reference Number: GCEC-PK-154/2022

5.5 Surface Water Analysis Result

Surface water samples was collected from 01 location i.e., Canal Tarnab, Peshawar on 10-06-2022 which were preserved and submitted in GCEC-Laboratory according to the standard methods. Summary of Analysis Results are given in Table 5-6.

Table 5-6: Summary of Surface Water Analysis Results

Sample Marking & Identification					
01	Canal Tarnab, Peshawar	Sampling Coordinates	34°01'00.8"N 71°42'16.7"E		
Parameters	Analysis Method	Unit	LOR	Result 01	FAO**
PHYSICAL & CHEMICAL ANALYSIS					
Temperature	APHA-2550-B	°C	-	2.67	-
pH**	APHA 4500 H+ B	pH unit	0.01	7.01	6.5-8.4
Total Dissolved Solid (TDS)**	APHA-2540 C	mg/l	1.0	196.0	450-2000
Oil and Grease**	USEPA-1664	mg/l	0.2	<0.2	-
Biological Oxygen Demand	APHA-5210 B	mg/l	1.0	9.4	-
Chemical Oxygen Demand**	APHA 5220 D	mg/l	1.0	39.0	-
Total Suspended Solid**	APHA-2540-C	mg/l	1.0	113.0	-
Phenolic Compound	APHA-5530 D	mg/l	0.01	0.05	-
Chloride (Cl)**	APHA-4500 B	mg/l	0.24	23.99	4-10
Fluoride (F)**	APHA-4500F-D	mg/l	0.01	<0.01	1.0
Cyanide (CN)	APHA-4500CN-E	mg/l	0.01	<0.01	-
Detergent	APHA-5540 C	mg/l	-	ND	-
Sulphate**	APHA-4500 SO ₄ -2 C	mg/l	0.41	39.92	-
Sulphide	APHA-4500-S2-F	mg/l	0.2	<0.2	-
Ammonia	APHA-4500-NH ₃ -B,C	mg/l	0.002	4.3	-
Silver	APHA-5500 Ag-B	mg/l	0.0032	<0.0032	-
Cadmium**	APHA 3111 B	mg/l	0.0028	<0.0028	0.10
Chromium**	APHA-3111 B	mg/l	0.0054	<0.0054	0.10
Copper**	APHA-3111 B	mg/l	0.0045	<0.0045	0.20
Lead**	APHA-3111 B	mg/l	0.013	<0.013	5.0
Mercury	APHA 3500 Hg B	mg/l	0.0008	<0.0008	0.01
Nickel**	APHA 3111 C	mg/l	0.008	<0.008	0.20
Zinc**	APHA-3111 B	mg/l	0.0033	<0.0033	2.0
Arsenic	APHA-3500As B	mg/l	0.01	<0.01	0.10
Barium	APHA-3500Ba B	mg/l	0.031	<0.031	-
Manganese**	APHA 3111 B	mg/l	0.0016	<0.0016	0.20
Iron**	APHA-3111 B	mg/l	0.1	<0.1	-
Boron	APHA-4500B-C	mg/l	0.1	<0.1	0.7-3.0
Total Chlorine	APHA 4500Cl-B	mg/l	0.1	<0.1	-
Selenium	APHA-3500Se C	mg/l	-	ND	-
Pesticides	APHA-6630 B	mg/l	-	ND	-
Total Toxic Metals	-	mg/l	-	0.01	-

Abbreviations: ND: Not Detected LOR: Limit of Reporting FAO: Food and Agriculture Organization
 Note: * Uncertainty of all the parameters and laboratory conditions at the time of analysis will be provided as per client's requirement. The lab environmental conditions are maintained at 25±5°C and humidity at 50±20%. Remarks: All the above mentioned results are in compliance with FAO standards except chloride i.e: 23.99 mg/l.
 Disclaimer: The results are solely of the sample provided. **All the stored parameters are P/N/A/C accredited.

SECTION 6: CONCLUSION

Environmental monitoring was performed to assess the environmental conditions of project area and its surroundings.

The results of ambient air monitoring depict that all the tested parameters for air quality were within the permissible limits prescribed by environmental protection agency.

Noise monitoring result of selected site was within the prescribed limits for commercial noise of National Environmental Quality Standards.

From the laboratory test results for drinking it is evident that all of the physical and chemical testing parameters are within the prescribed limits of NEQS.

Results of waste water sample showed compliance with permissible limits of National Environmental Quality Standards.

There are no NEQS values assigned for surface water so they will be compared with FAO Standards. Results of surface water sample showed compliance with permissible limits of Food and Agriculture Organization Standards except the value of chloride i.e. 23.99 (FAO=4-10 mg/l) of Canal Tarnab, Peshawar.

Green Crescent

Environmental Consultants (Pvt) Ltd.

Reference Number: GCEC-PK-154/2022

ANNEXURE 1:
Monitoring
&
Analysis Reports



Green Crescent
Environmental Consultants (Pvt) Ltd.



Punjab-EPA Certified
Laboratory
Federal-EPA Certified
Standard Laboratory

Monitoring & Test Report

- **Drinking Water**
- **Waste Water**
- **Surface Water**
- **Ambient Air**
- **Meteorological Data**
- **Noise Monitoring**

NESPAK

18th June, 2022

Job Reference No.: GCEC-PK-154/2022

ANNEX-I



Green Crescent
Environmental Consultants (Pvt) Ltd.



Punjab-EPA Certified
Laboratory
Federal-EPA Certified
Laboratory

Client Detail:

Name of Contact Person:	Mr. Irfan-ul-Haq
Designation:	VP-G1 /GE DIVISION NESPAK
Contact Number:	-
Telephone Number:	042-9909000
Email:	info@nespak.com.pk
Address:	NESPAK House, 1-C Block-N, Model Town Extension Lahore


GCEC Details:

Director:	Mr. Mian Khurram Usman
Telephone:	+92 42 35962885
Fax:	+92 42 35962884
Email:	manager.operations@gcec.ac
Address:	House No. 368-B Block B, Canal View, Lahore


Signatories:

Zara Yousaf
(Coordination Department)

ANNEX-I



Green Crescent
Environmental Consultants (Pvt) Ltd.




Punjab-EPA Certified
Laboratory
Federal-EPA Certified
Laboratory

Sample Details

Job Ref. No:	GCEC-PK-154/2022	Client Name:	NESPAK (PVT) LTD.
No. of Samples:	One	Sample Matrix:	Drinking Water Sample
Sample Date:	10-06-2022	Sampling Method:	APIHA 1060-B & C
Sample Receipt Date:	11-06-2022	Sampled By:	GCEC

Sample Identification

01 Attock Pump Amangarh Village	Sample Coordinates 34°00'36.6"N 71°55'54.5"E
-----------------------------------	--



Parameters	Analysis Method	Unit	LOR	Result	NEQS
				01	
PHYSICAL & CHEMICAL ANALYSIS					
pH**	APIHA-4500H* B	-	0.01	7.17	6.5-8.5
Odor	In-house	-	-	Odorless	Non-Objectionable
Taste	In-house	-	-	Sweet	Non-Objectionable
Color	APIHA-2120 B/C	Pt/Co	1.0	<1.0	≤15 TCU
Turbidity**	APIHA-2130 B	NTU	-	ND	<5 NTU
Total Hardness**	APIHA-2340 B & C	mg/l	0.1	344.0	< 500 mg/l
Total Dissolved Solid (TDS)**	APIHA-2540 C	mg/l	1.0	838.0	< 1000
Ammonia	APIHA-4500-NH-B	mg/l	0.002	<0.002	-
Chloride**	APIHA-4500 B	mg/l	0.24	77.97	< 250
Cyanide (CN)	APIHA-4500-CN E	mg/l	0.01	<0.01	≤ 0.05
Fluoride (F)**	APIHA-4500F* D	mg/l	0.01	<0.01	≤ 1.5
Nitrite	APIHA-4500NO2 B	mg/l	0.01	<0.01	≤ 3 (P)
Nitrate**	APIHA-4500NO3 C	mg/l	0.1	2.2	≤ 50
Phenolic Compound	APIHA-5530 D	mg/l	0.01	<0.01	-
Residual Chlorine	APIHA-4500CI G	mg/l	0.1	<0.1	0.2-0.5
Aluminum (Al)	APIHA-3111Al B	mg/l	0.028	<0.028	≤ 0.2
Cadmium**	APIHA-3111 B	mg/l	0.0028	<0.0028	0.01
Copper**	APIHA-3111 B	mg/l	0.0045	<0.0045	2
Chromium**	APIHA-3111 B	mg/l	0.0054	<0.0054	≤ 0.05 (P)
Mercury	APIHA-3112Hg B	mg/l	0.0008	<0.0008	≤ 0.001
Antimony (Sb)**	APIHA 3111 B	mg/l	-	ND	≤ 0.005 (P)
Nickel**	APIHA-3111 C	mg/l	0.008	<0.008	≤ 0.02
Zinc**	APIHA-3111 B	mg/l	0.0033	<0.0033	5.0
Arsenic	APIHA-3111As B	mg/l	0.01	<0.01	≤ 0.05 (P)
Barium	APIHA 3111Ba B	mg/l	0.031	<0.031	0.7
Manganese**	APIHA-3111 B	mg/l	0.0016	<0.0016	≤ 0.5
Iron**	APIHA-3111 B	mg/l	0.1	<0.1	-
Boron	APIHA-4500-B (C)	mg/l	0.1	<0.1	0.3
Lead**	APIHA-3111 B	mg/l	0.013	<0.013	≤ 0.05
Selenium	APIHA-3111Se B	mg/l	-	ND	0.01 (P)
MICROBIOLOGICAL ANALYSIS					
Total Coliforms	APIHA:9222 B	CFC/100ml	-	Absent	0/100ml
Faecal Coliforms (Ecol)	APIHA:9222 D	CFC/100ml	-	Absent	0/100ml

Abbreviations: ND: Not Detected LOR: Limit of Reporting NEQS: National Environmental Quality Standards

Note:
 * Uncertainty of all the parameters and laboratory conditions at the time of analysis will be provided as per client's requirement. The lab environmental conditions are maintained at 25±5°C and humidity at 50±20%. **Remarks:** All parameters are in compliance with NEQS.
Disclaimer: The results are solely of the sample provided. ** All the starred parameters are PNI-AC accredited.

Lab Manager

ANNEX-I

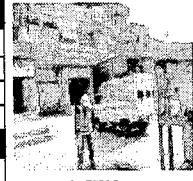


Green Crescent
Environmental Consultants (Pvt) Ltd.



Punjab-EPA Certified
Laboratory
Federal-EPA Certified
Hazardous Laboratory

Sample Details			
Job Ref. No:	GCEC-PK-154/2022	Client Name:	NESPAK (PVT) LTD.
No. of Samples:	One	Sample Matrix:	Drinking Water Sample
Sample Date:	10-06-2022	Sampling Method:	APHA 1060-B & C
Sample Receipt Date:	11-06-2022	Sampled By:	GCEC
Sample Identification			
02	Maqbol Property Dealer, Pabbi	Sample Coordinates	34°00'34.3"N 71°47'43.7"E



Parameters	Analysis Method	Unit	LOR	Result	NEQS
				02	
PHYSICAL & CHEMICAL ANALYSIS					
pH**	APHA-45001 B	-	0.01	7.25	6.5-8.5
Odor	In-house	-	-	Odorless	Non-Objectionable
Taste	In-house	-	-	Sweet	Non-Objectionable
Color	APHA-2120 B/C	Pt/Co	1.0	<1.0	≤15 TCU
Turbidity**	APHA-2130 B	NTU	-	ND	<5 NTU
Total Hardness**	APHA-2340 B & C	mg/l	0.1	276.0	< 500 mg/l
Total Dissolved Solid (TDS)**	APHA-2540 C	mg/l	1.0	854.0	< 1000
Ammonia	APHA-4500-NH ₃ -B	mg/l	0.002	<0.002	-
Chloride**	APHA-4500 B	mg/l	0.24	67.97	< 250
Cyanide (CN)	APHA-4500CN E	mg/l	0.01	<0.01	≤ 0.05
Fluoride (F)**	APHA-4500F D	mg/l	0.01	<0.01	≤ 1.5
Nitrite	APHA-4500NO ₂ B	mg/l	0.01	<0.01	≤ 3 (P)
Nitrate**	APHA-4500NO ₃ C	mg/l	0.1	<0.1	≤ 50
Phenolic Compound	APHA-5530 D	mg/l	0.01	<0.01	-
Residual Chlorine	APHA-4500Cl G	mg/l	0.1	<0.1	0.2-0.5
Aluminum (Al)	APHA-3111A B	mg/l	0.028	<0.028	≤ 0.2
Cadmium**	APHA-3111 B	mg/l	0.0028	<0.0028	0.01
Copper**	APHA-3111 B	mg/l	0.0045	<0.0045	2
Chromium**	APHA-3111 B	mg/l	0.0054	<0.0054	≤ 0.05 (P)
Mercury	APHA-3112Hg B	mg/l	0.0008	<0.0008	≤ 0.001
Antimony (Sb)**	APHA-3111 B	mg/l	-	ND	≤ 0.005 (P)
Nickel**	APHA-3111 C	mg/l	0.008	<0.008	≤ 0.02
Zinc**	APHA-3111 B	mg/l	0.0033	<0.0033	5.0
Arsenic	APHA-3111As B	mg/l	0.01	<0.01	≤ 0.05 (P)
Barium	APHA-3111Ba B	mg/l	0.031	<0.031	0.7
Manganese**	APHA-3111 B	mg/l	0.0016	<0.0016	≤ 0.5
Iron**	APHA-3111 B	mg/l	0.1	<0.1	-
Boron	APHA-4500-B (C)	mg/l	0.1	<0.1	0.3
Lead**	APHA-3111 B	mg/l	0.013	<0.013	≤ 0.05
Selenium	APHA-3111Se B	mg/l	-	ND	0.01 (P)
MICROBIOLOGICAL ANALYSIS					
Total Coliforms	APHA-9222 B	CFU/100ml	-	Absent	0/100ml
Faecal Coliforms (E.coli)	APHA-9222 D	CFU/100ml	-	Absent	0/100ml

Abbreviations:
 ND: Not Detected LOR: Limit of Reporting NEQS: National Environmental Quality Standards

Note:
 * Uncertainty of all the parameters and laboratory conditions at the time of analysis will be provided as per client's requirement. The lab environmental conditions are maintained at 25±5C° and humidity at 50±20%. **Remarks:** All parameters are in compliance with NEQS.
Disclaimer: The results are solely of the sample provided. **All the starred parameters are PNCAC accredited.

 Lab Manager

ANNEX-I

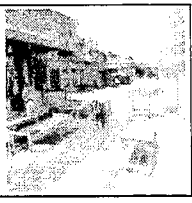


Green Crescent
Environmental Consultants (Pvt) Ltd.



Punjab-EPA Certified
Laboratory
Federal-EPA Certified
Laboratory

Sample Details			
Job Ref. No:	GCEC-PK-154/2022	Client Name:	NESPAK (PVT) LTD.
No. of Samples:	One	Sample Matrix:	Drinking Water Sample
Sample Date:	10-06-2022	Sampling Method:	APHA 1060-B & C
Sample Receipt Date:	11-06-2022	Sampled By:	GCEC
Sample Identification			
03	Taru Jabba Kabab Centre, Taru Jabba	Sample Coordinates	34°00'56.1"N 71°43'29.7"E



Parameters	Analysis Method	Unit	LOR	Result	NEQS
				03	
PHYSICAL & CHEMICAL ANALYSIS					
pH**	APHA-4500H* B	-	0.01	7.23	6.5-8.5
Odor	In-house	-	-	Odorless	Non-Objectionable
Taste	In-house	-	-	Sweet	Non-Objectionable
Color	APHA-2120 B/C	Pt/Co	1.0	<1.0	≤15 TCU
Turbidity**	APHA-2130 B	NTU	-	ND	<5 NTU
Total Hardness**	APHA-2340 B & C	mg/l	0.1	364.0	< 500 mg/l
Total Dissolved Solid (TDS)**	APHA-2540 C	mg/l	1.0	776.0	< 1000
Ammonia	APHA-4500-NH ₃ -B	mg/l	0.002	<0.002	-
Chloride**	APHA-4500 B	mg/l	0.24	47.98	< 250
Cyanide (CN)	APHA-4500CN B	mg/l	0.01	<0.01	≤ 0.05
Fluoride (F)**	APHA-4500F D	mg/l	0.01	<0.01	≤ 1.5
Nitrite	APHA 4500NO2 B	mg/l	0.01	<0.01	≤ 3 (P)
Nitrate**	APHA-4500NO3 C	mg/l	0.1	<0.1	≤ 50
Phenolic Compound	APHA-5530 D	mg/l	0.01	<0.01	-
Residual Chlorine	APHA-4500Cl G	mg/l	0.1	<0.1	0.2-0.5
Aluminum (Al)	APHA-3111Al B	mg/l	0.028	<0.028	≤ 0.2
Cadmium**	APHA-3111 B	mg/l	0.0028	<0.0028	0.01
Copper**	APHA-3111 B	mg/l	0.0045	<0.0045	2
Chromium**	APHA-3111 B	mg/l	0.0054	<0.0054	≤ 0.05 (P)
Mercury	APHA-3112Hg B	mg/l	0.0008	<0.0008	≤ 0.001
Antimony (Sb)**	APHA-3111 B	mg/l	-	ND	≤ 0.005 (P)
Nickel**	APHA-3111 C	mg/l	0.008	<0.008	≤ 0.02
Zinc**	APHA-3111 B	mg/l	0.0033	<0.0033	5.0
Arsenic	APHA-3111As B	mg/l	0.01	<0.01	≤ 0.05 (P)
Barium	APHA-3111Ba B	mg/l	0.031	<0.031	0.7
Manganese**	APHA-3111 B	mg/l	0.0016	<0.0016	≤ 0.5
Iron**	APHA-3111 B	mg/l	0.1	<0.1	-
Boron	APHA-4500 B (C)	mg/l	0.1	<0.1	0.3
Lead**	APHA-3111 B	mg/l	0.013	<0.013	≤ 0.05
Selenium	APHA-3111Se B	mg/l	-	ND	0.01 (P)
MICROBIOLOGICAL ANALYSIS					
Total Coliforms	APHA:9222 B	CFU/100ml	-	Absent	0/100ml
Faecal Coliforms (E.coli)	APHA:9222 D	CFU/100ml	-	Absent	0/100ml

Abbreviations:
 ND: Not Detected LOR: Limit of Reporting NEQS: National Environmental Quality Standards
Note:
 * Uncertainty of all the parameters and laboratory conditions at the time of analysis will be provided as per client's requirement. The lab environmental conditions are maintained at 25±5°C and humidity at 50±20%. **Remarks:** All parameters are in compliance with NEQS.
Disclaimer: The results are solely of the sample provided. ** All the stated parameters are PNAC accredited.

Lab Manager

ANNEX-I



Green Crescent
Environmental Consultants (Pvt) Ltd.



Punjab-EPA Certified
Federal-EPA Certified

Sample Details			
Job Ref. No:	GCFC-PK-154/2022	Client Name:	NESPAK (PVT) LTD.
No. of Samples:	One	Sample Matrix:	Waste Water Sample
Sample Date:	10-06-2022	Sampling Method:	APHA 1060 B & C
Sample Receipt Date:	11-06-2022	Sampled By:	GCFC
Sample Identification			
01	Near Attock Pump, Amargarh	Sampling Coordinates	34°00'38.4"N 71°55'53.6"E

Parameters	Analysis Method	Unit	LOR	Result	NEQS
				01	
PHYSICAL & CHEMICAL ANALYSIS					
Temperature	APHA-2550-B	°C	-	2.6	≤3
pH**	APHA-4500-H ⁺ B	pH unit	0.01	6.9	6-9
Total Dissolved Solid (TDS)**	APHA-2540-C	mg/l	1.0	654.0	3500
Oil and Grease**	USLEPA-1664	mg/l	0.2	<0.2	10
Biological Oxygen Demand	APHA-5210-B	mg/l	1.0	12.4	80
Chemical Oxygen Demand**	APHA-5220-D	mg/l	1.0	42.0	150
Total Suspended Solid**	APHA-2540-C	mg/l	1.0	85.0	200
Phenolic Compound	APHA-5530-D	mg/l	0.01	0.08	0.1
Chloride (Cl)**	APHA-4500-B	mg/l	0.24	67.97	1000
Fluoride (F)**	APHA-4500-F-D	mg/l	0.01	<0.01	10
Cyanide (CN)	APHA-4500-CN-E	mg/l	0.01	<0.01	1.0
Detergent	APHA-5540-C	mg/l	-	ND	20
Sulphate**	APHA-4500-SO ₄ ²⁻ C	mg/l	0.41	59.68	600
Sulphide	APHA-4500-S ₂ F	mg/l	0.2	<0.2	1.0
Ammonia	APHA-4500-NH ₃ -B ₂ C	mg/l	0.002	14.3	40
Silver	APHA-3500-Ag-B	mg/l	0.0032	<0.0032	1.0
Cadmium**	APHA-3111-B	mg/l	0.0028	<0.0028	0.1
Chromium**	APHA-3111-B	mg/l	0.0054	<0.0054	1.0
Copper**	APHA-3111-B	mg/l	0.0045	<0.0045	1.0
Lead**	APHA-3111-B	mg/l	0.013	<0.013	0.5
Mercury	APHA-3500-Hg-B	mg/l	0.0008	<0.0008	0.01
Nickel**	APHA-3111-C	mg/l	0.008	<0.008	1.0
Zinc**	APHA-3111-B	mg/l	0.0033	<0.0033	5.0
Arsenic	APHA-3500-As-B	mg/l	0.01	0.01	1.0
Barium	APHA-3500-Ba-B	mg/l	0.031	<0.031	1.5
Manganese**	APHA-3111-B	mg/l	0.0016	<0.0016	1.5
Iron**	APHA-3111-B	mg/l	0.1	1.2	8.0
Boron	APHA-4500B-C	mg/l	0.1	<0.1	6.0
Total Chlorine	APHA-4500Cl-B	mg/l	0.1	<0.1	1.0
Selenium	APHA-3500Se-C	mg/l	-	ND	0.5
Pesticides	APHA-6630-B	mg/l	-	ND	0.15
Total Toxic Metals	-	mg/l	-	0.01	2

Abbreviations:

ND: Not Detected

LOR: Limit of Reporting

NEQS: National Environmental Quality Standards

Note:

* Uncertainty of all the parameters and laboratory conditions at the time of analysis will be provided as per client's requirement. The lab environmental conditions are maintained at 25±5°C and humidity at 50±20%. **Remarks:** All parameters are in compliance with NEQS.

Disclaimer: The results are solely of the sample provided. ** All the starred parameters are PNAAC accredited.

Lab Manager

ANNEX-I



Green Crescent
Environmental Consultants (Pvt) Ltd.



Punjab-EPA Certified
Laboratory
Federal-EPA Certified
National Laboratory

Sample Details			
Job Ref. No:	GCEC-PK-154/2022	Client Name:	NESPAK (PVT) LTD.
No. of Samples:	One	Sample Matrix:	Waste Water Sample
Sample Date:	10-06-2022	Sampling Method:	APHA 1060 B & C
Sample Receipt Date:	11-06-2022	Sampled By:	GCEC
Sample Identification			
02	Drain Near IPT3 Mosque	Sampling Coordinates	34°00'36.7"N 71°55'55.1"E



Parameters	Analysis Method	Unit	LOR	Result	NEQS
				02	
PHYSICAL & CHEMICAL ANALYSIS					
Temperature	APIA-2550-B	°C	-	2.5	5.3
pH**	APHA-4500-H ⁺ B	pH unit	0.01	6.98	6-9
Total Dissolved Solid (TDS)**	APHA-2540 C	mg/l	1.0	739.0	3500
Oil and Grease***	USEPA-1664	mg/l	0.2	<0.2	10
Biological Oxygen Demand	APHA-5210 B	mg/l	1.0	14.2	80
Chemical Oxygen Demand**	APHA-5220-D	mg/l	1.0	47.0	150
Total Suspended Solid**	APHA-2540-C	mg/l	1.0	103.0	200
Phenolic Compound	APHA-5530 D	mg/l	0.01	0.07	0.1
Chloride (Cl)**	APHA-4500 B	mg/l	0.24	67.97	1000
Fluoride (F)**	APHA-4500F D	mg/l	0.01	<0.01	10
Cyanide (CN)	APHA 4500CN E	mg/l	0.01	<0.01	1.0
Detergent	APHA-5540 C	mg/l	-	ND	20
Sulphate**	APHA-4500-SO ₄ ²⁻ C	mg/l	0.41	63.79	600
Sulphide	APHA-4500-S ₂ ²⁻ F	mg/l	0.2	<0.2	1.0
Ammonia	APHA-4500-NH ₃ -B,C	mg/l	0.002	12.1	40
Silver	APHA-3500Ag B	mg/l	0.0032	<0.0032	1.0
Cadmium**	APHA-3111 B	mg/l	0.0028	<0.0028	0.1
Chromium**	APHA-3111 B	mg/l	0.0054	<0.0054	1.0
Copper**	APHA-3111 B	mg/l	0.0045	<0.0045	1.0
Lead**	APHA-3111 B	mg/l	0.013	<0.013	0.5
Mercury	APHA-3500-Hg B	mg/l	0.0008	<0.0008	0.01
Nickel**	APHA-3111 C	mg/l	0.008	<0.008	1.0
Zinc**	APHA 3111 B	mg/l	0.0033	<0.0033	5.0
Arsenic	APHA-3500As B	mg/l	0.01	0.01	1.0
Barium	APHA-3500Ba B	mg/l	0.031	<0.031	1.5
Manganese**	APHA-3111 B	mg/l	0.0016	<0.0016	1.5
Iron**	APHA 3111 B	mg/l	0.1	1.5	8.0
Boron	APHA-4500B-C	mg/l	0.1	<0.1	6.0
Total Chlorine	APHA-4500Cl-B	mg/l	0.1	<0.1	1.0
Selenium	APHA-3500Se C	mg/l	-	ND	0.5
Pesticides	APHA 6630 B	mg/l	-	ND	0.15
Total Toxic Metals	-	mg/l	-	0.01	2

Abbreviations:

ND: Not Detected

LOR: Limit of Reporting

NEQS: National Environmental Quality Standards

Note:

* Uncertainty of all the parameters and laboratory conditions at the time of analysis will be provided as per client's requirement. The lab environmental conditions are maintained at 25±5°C and humidity at 50±20%. **Remarks:** All parameters are in compliance with NEQS.

Disclaimer: The results are solely of the sample provided. **All the starred parameters are PNAC accredited.

Lab Manager

ANNEX-I

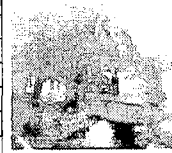


Green Crescent
Environmental Consultants (Pvt) Ltd.



Punjab-EPA Certified
Federal-EPA Certified
ISO 15189:2013

Sample Details			
Job Ref. No:	GCEC-PK-154/2022	Client Name:	NESPAK (PVT) LTD.
No. of Samples:	One	Sample Matrix:	Surface Water Sample
Sample Date:	10-06-2022	Sampling Method:	APHA 1060 B & C
Sample Receipt Date:	11-06-2022	Sampled By:	GCEC
Sample Identification			
01	Canal Tarnab, Peshawar	Sampling Coordinates	34°01'00.8"N 71°42'16.7"E



Parameters	Analysis Method	Unit	LOR	Result	FAO**
				01	
PHYSICAL & CHEMICAL ANALYSIS					
Temperature	APHA-2550-B	°C	-	2.67	-
pH**	APHA-4500-H* B	pH unit	0.01	7.01	6.5-8.4
Total Dissolved Solid (TDS)**	APHA-2540 C	mg/l	1.0	196.0	450-2000
Oil and Grease**	USEPA-1664	mg/l	0.2	<0.2	-
Biological Oxygen Demand	APHA-5210 B	mg/l	1.0	9.4	-
Chemical Oxygen Demand**	APHA-5220-D	mg/l	1.0	39.0	-
Total Suspended Solid**	APHA-2540-C	mg/l	1.0	113.0	-
Phenolic Compound	APHA-5530 D	mg/l	0.01	0.05	-
Chloride (Cl)**	APHA-4500 B	mg/l	0.24	23.99	4-10
Fluoride (F)**	APHA-4500F-D	mg/l	0.01	<0.01	1.0
Cyanide (CN)	APHA-4500CN-E	mg/l	0.01	<0.01	-
Detergent	APHA-5540 C	mg/l	-	ND	-
Sulphate**	APHA-4500-SO ₄ ²⁻ C	mg/l	0.41	39.92	-
Sulphide	APHA-4500-S ₂ F	mg/l	0.2	<0.2	-
Ammonia	APHA-4500-NH ₃ -B-C	mg/l	0.002	4.3	-
Silver	APHA-3500-Ag-B	mg/l	0.0032	<0.0032	-
Cadmium**	APHA-3111 B	mg/l	0.0028	<0.0028	0.10
Chromium**	APHA-3111 B	mg/l	0.0054	<0.0054	0.10
Copper**	APHA-3111 B	mg/l	0.0045	<0.0045	0.20
Lead**	APHA-3111 B	mg/l	0.013	<0.013	5.0
Mercury	APHA-3500-Hg B	mg/l	0.0008	<0.0008	0.01
Nickel**	APHA-3111 C	mg/l	0.008	<0.008	0.20
Zinc**	APHA-3111 B	mg/l	0.0033	<0.0033	2.0
Arsenic	APHA-3500As B	mg/l	0.01	<0.01	0.10
Barium	APHA-3500Ba B	mg/l	0.031	<0.031	-
Manganese**	APHA-3111 B	mg/l	0.0016	<0.0016	0.20
Iron**	APHA-3111 B	mg/l	0.1	<0.1	-
Boron	APHA-4500B-C	mg/l	0.1	<0.1	0.7-3.0
Total Chlorine	APHA-4500Cl B	mg/l	0.1	<0.1	-
Selenium	APHA-3500Se C	mg/l	-	ND	-
Pesticides	APHA-6630 B	mg/l	-	ND	-
Total Toxic Metals		mg/l		0.01	

Abbreviations:

ND: Not Detected

LOR: Limit of Reporting

FAO: Food and Agriculture Organization

Note:

* Uncertainty of all the parameters and laboratory conditions at the time of analysis will be provided as per client's requirement. The lab environmental conditions are maintained at 25±5°C and humidity at 50±20%. Remarks: All the above mentioned results are in compliance with FAO standards except chloride i.e. 23.99 mg/l. Disclaimer: The results are solely of the sample provided. ** All the starred parameters are PNAC accredited.

Lab Manager



Punjab-EPA Certified
Lahore Laboratory
Federal-EPA Certified
Islamabad Laboratory

Ambient Air & Noise Monitoring
Location-01

Near Makkah Medical Centre
(Peshawar)





Green Crescent
Environmental Consultants (Pvt) Ltd.



Punjab-EPA Certified
Lahore Laboratory
Federal-EPA Certified
Islamabad Laboratory

Ambient Air Quality Monitoring

Job Reference Number	GCEC-PK-154/2022
Monitoring Point	Near Makkah Medical Centre
Date of Intervention	07-June-2022 to 08-June-2022
Monitoring Coordinates	34°00'51.3"N 71°45'29.7"E

Sr. #	Time	CO (mg/m ³)	NO (µg/m ³)	NO ₂ (µg/m ³)	NO _x (µg/m ³)	SO ₂ (µg/m ³)
1.	9:00	1.45	15.89	23.87	39.76	19.59
2.	10:00	2.12	16.67	22.64	39.31	18.61
3.	11:00	1.99	15.78	24.02	39.80	20.57
4.	12:00	2.05	15.45	23.77	39.22	21.38
5.	13:00	1.21	16.02	22.79	38.81	20.52
6.	14:00	1.12	17.74	25.02	42.76	22.12
7.	15:00	2.23	18.01	24.05	42.06	20.22
8.	16:00	2.87	15.65	22.79	38.44	17.76
9.	17:00	2.22	14.34	19.47	33.81	19.48
10.	18:00	2.12	13.99	21.01	35.00	20.78
11.	19:00	2.01	15.32	20.58	35.90	18.98
12.	20:00	1.04	14.98	18.57	33.55	19.02
13.	21:00	2.87	13.35	19.79	33.14	18.45
14.	22:00	2.34	12.56	20.23	32.79	17.32
15.	23:00	2.13	14.32	19.77	34.09	16.52
16.	0:00	2.11	12.87	18.99	31.86	15.59
17.	1:00	2.76	14.24	20.9	35.14	16.87
18.	2:00	2.09	13.32	18.77	32.09	16.45
19.	3:00	1.45	14.78	19.77	34.55	15.99
20.	4:00	1.45	13.87	20.57	34.44	18.45
21.	5:00	1.99	17.34	24.43	41.77	17.11
22.	6:00	1.98	16.11	22.79	38.90	19.01
23.	7:00	2.66	15.45	23.79	39.24	21.23
24.	8:00	2.34	17.89	22.34	40.23	19.98
Average Concentration		2.03	15.40	22.15	36.94	18.83

E(QA)



Green Crescent
Environmental Consultants (Pvt) Ltd.



Punjab-EPA Certified
Lahore Laboratory
Federal-EPA Certified
Islamabad Laboratory

Ambient Air Quality Monitoring

Job Reference Number	GCEC-PK-154/2022
Monitoring Point	Near Makkah Medical Centre
Date of Intervention	07-June-2022 to 08-June-2022
Monitoring Coordinates	34°00'51.3"N 71°45'29.7"E

Parameter	Unit	Monitoring Duration	LDL	Average Obtained Concentration	NEQS
Nitrogen Dioxide (NO ₂)	µg/m ³	24 Hours	1.00	22.15	80.0
Nitrogen Oxide (NO)	µg/m ³	24 Hours	1.00	15.40	40.0
NO _x	µg/m ³	24 Hours	1.00	36.94	120.0
Sulphur Dioxide (SO ₂)	µg/m ³	24 Hours	1.00	18.83	120.0
Carbon Monoxide (CO)	mg/m ³	24 Hours	0.01	2.03	05.0*
Ozone (O ₃)	µg/m ³	24 Hours	-	14.40	130.0**
Particulate Matter (PM _{2.5})	µg/m ³	24 Hours	1.00	21.38	35.0
Particulate Matter (PM ₁₀)	µg/m ³	24 Hours	1.00	102.38	150.0
Suspended Particulate Matter (SPM)	µg/m ³	24 Hours	1.00	156.76	500.0
Lead Airborne Particles	µg/m ³	24 Hours	-	0.12	1.5

Abbreviations:

µg/m³= Micrograms per Cubic Meter

mg/m³= Milligrams per Cubic Meter

LDL= Lowest Detection Limit

NEQS= National Environmental Quality Standards

*08 hour standard for CO

**01 hour standard for O₃

Remarks: All parameters are in compliance with NEQS.

E(QA)



Green Crescent
Environmental Consultants (Pvt) Ltd.



Punjab-EPA Certified
Lahore Laboratory
Federal-EPA Certified
Islamabad Laboratory

Meteorological Data

Job Reference Number	GCEC-PK-154/2022
Monitoring Point	Near Makkah Medical Centre
Date of Intervention	07-June-2022 to 08-June-2022
Monitoring Coordinates	34°00'51.3"N 71°45'29.7"E

Time	Ambient	Wind Direction	Wind Velocity	Humidity	Pressure (mm of Hg)
	Temperature °C		m/s	%	
9:00	35	NE	3.2	24	752.2
10:00	37	NE	3.1	20	751.2
11:00	39	NE	3.3	16	750.4
12:00	43	NE	3.1	10	758.2
13:00	44	W	3.1	9	751.9
14:00	44	W	2.1	8	753.2
15:00	44	W	3.2	8	753.8
16:00	45	W	3.2	8	754.2
17:00	43	SW	3.1	7	754.7
18:00	43	SW	2.3	7	751.2
19:00	43	SW	2.4	7	754.3
20:00	41	SW	2.1	9	751.2
21:00	38	NE	2.5	13	753.2
22:00	36	NE	2.1	16	753.8
23:00	34	NE	2.4	19	753.9
00:00	33	NE	2.4	22	751.3
1:00	30	N	2.4	33	753.2
2:00	30	N	2.1	34	751.9
3:00	28	N	3.3	36	755.2
4:00	28	N	4.1	37	748.3
5:00	27	N	3.3	38	749.4
6:00	27	NE	2.4	37	751.2
7:00	30	NE	2.3	33	751.8
8:00	33	NE	2.7	30	753.6

E(QA)



Green Crescent
Environmental Consultants (Pvt) Ltd.



Punjab-EPA Certified
Lahore Laboratory
Federal-EPA Certified
Islamabad Laboratory

Noise Level Monitoring Report

Job Reference Number	GCEC-PK-154/2022
Monitoring Point	Near Makkah Medical Centre
Date of Intervention	07-June-2022 to 08-June-2022
Monitoring Coordinates	34°00'51.3"N 71°45'29.7"E

Sr. #	Time	Method/Technique	Unit	Results		
				LAavg	NEQS (Commercial)	
Night Time						
1.	23:00	Noise Meter	dB	54.3	55.0	
2.	00:00	Noise Meter	dB	53.2		
3.	01:00	Noise Meter	dB	53.6		
4.	02:00	Noise Meter	dB	55.4		
5.	03:00	Noise Meter	dB	52.5		
6.	04:00	Noise Meter	dB	54.3		
7.	05:00	Noise Meter	dB	53.9		
8.	06:00	Noise Meter	dB	54.8		
Night Time Average				dB	54.0	55.0
Day Time						
9.	07:00	Noise Meter	dB	64.7	65.0	
10.	08:00	Noise Meter	dB	63.9		
11.	09:00	Noise Meter	dB	64.8		
12.	10:00	Noise Meter	dB	63.7		
13.	11:00	Noise Meter	dB	64.3		
14.	12:00	Noise Meter	dB	63.2		
15.	13:00	Noise Meter	dB	63.2		
16.	14:00	Noise Meter	dB	63.6		
17.	15:00	Noise Meter	dB	65.8		
18.	16:00	Noise Meter	dB	64.2		
19.	17:00	Noise Meter	dB	64.2		
20.	18:00	Noise Meter	dB	60.1		
21.	19:00	Noise Meter	dB	59.2		
22.	20:00	Noise Meter	dB	54.5		
23.	21:00	Noise Meter	dB	53.6		
24.	22:00	Noise Meter	dB	54.9		
Day Time Average				dB	61.7	65.0

E(QA)



Green Crescent
Environmental Consultants (Pvt) Ltd.



Punjab-EPA Certified
Lahore Laboratory
Federal-EPA Certified
Islamabad Laboratory

Ambient Air & Noise Monitoring

Location-02

**Near Nasirpur Railway Station
(Peshawar)**



ANNEX-I



Green Crescent
Environmental Consultants (Pvt) Ltd.



Punjab-EPA Certified
Lahore Laboratory
Federal-EPA Certified
Islamabad Laboratory

Ambient Air Quality Monitoring

Job Reference Number	GCHC-PK-154/2022
Monitoring Point	Near Nasirpur Railway Station
Date of Intervention	08-June-2022 to 09-June-2022
Monitoring Coordinates	34°01'05.9"N 71°40'40.4"E

Sr. #	Time	CO (mg/m ³)	NO (ug/m ³)	NO ₂ (ug/m ³)	NO _x (ug/m ³)	SO ₂ (ug/m ³)
1.	9:00	1.98	15.45	21.23	36.68	16.43
2.	10:00	1.56	16.34	22.14	38.48	15.87
3.	11:00	2.12	16.45	21.77	38.22	17.21
4.	12:00	1.89	17.55	23.34	40.89	16.34
5.	13:00	2.54	15.34	24.21	39.55	22.12
6.	14:00	3.13	19.32	28.07	47.39	23.31
7.	15:00	2.19	18.54	26.99	45.53	24.45
8.	16:00	2.98	17.34	25.32	42.66	25.32
9.	17:00	2.91	18.21	27.07	45.28	19.23
10.	18:00	3.07	20.23	28.02	48.25	21.93
11.	19:00	3.21	17.43	25.04	42.47	24.42
12.	20:00	2.38	18.23	25.12	43.35	23.93
13.	21:00	2.66	19.23	26.43	45.66	21.23
14.	22:00	1.89	20.21	28.02	48.23	25.35
15.	23:00	2.77	17.02	24.01	41.03	18.23
16.	04:00	2.65	18.96	25.11	44.07	19.23
17.	1:00	1.97	17.98	26.65	44.63	20.12
18.	2:00	2.98	16.23	25.32	41.55	21.23
19.	3:00	1.76	17.41	26.04	43.45	20.87
20.	4:00	2.38	19.96	25.32	45.28	22.34
21.	5:00	2.81	18.31	28.11	46.42	23.22
22.	6:00	2.87	19.07	27.09	46.16	22.34
23.	7:00	2.62	17.96	26.11	44.07	23.43
24.	8:00	2.82	16.99	27.76	44.75	22.12
Average Concentration		2.66	18.65	26.44	43.50	21.26

E(QA)



Green Crescent
Environmental Consultants (Pvt) Ltd



Punjab-EPA Certified
Lahore Laboratory
Federal-EPA Certified
Islamabad Laboratory

Ambient Air Quality Monitoring

Job Reference Number	GCEC-PK-154/2022
Monitoring Point	Near Nasipur Railway Station
Date of Intervention	08-June-2022 to 09-June-2022
Monitoring Coordinates	34°01'05.9"N 71°40'40.4"E

Parameter	Unit	Monitoring Duration	LDL	Average Obtained Concentration	NEQS
Nitrogen Dioxide (NO ₂)	µg/m ³	24 Hours	1.00	26.44	80.0
Nitrogen Oxide (NO)	µg/m ³	24 Hours	1.00	18.65	40.0
NO _x	µg/m ³	24 Hours	1.00	43.50	120.0
Sulphur Dioxide (SO ₂)	µg/m ³	24 Hours	1.00	21.26	120.0
Carbon Monoxide (CO)	mg/m ³	24 Hours	0.01	2.66	05.0*
Ozone (O ₃)	µg/m ³	24 Hours	-	18.71	130.0**
Particulate Matter (PM _{2.5})	µg/m ³	24 Hours	1.00	23.50	35.0
Particulate Matter (PM ₁₀)	µg/m ³	24 Hours	1.00	103.71	150.0
Suspended Particulate Matter (SPM)	µg/m ³	24 Hours	1.00	160.21	500.0
Lead Airborne Particles	µg/m ³	24 Hours	-	0.23	1.5

Abbreviations:

µg/m³= Micrograms per Cubic Meter

mg/m³= Milligrams per Cubic Meter

LDL= Lowest Detection Limit

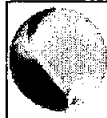
NEQS= National Environmental Quality Standards

*08 hour standard for CO

**01 hour standard for O₃

Remarks: All parameters are in compliance with NEQS.

E(QA)



Green Crescent

Environmental Consultants (Pvt) Ltd.



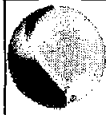
Punjab-EPA Certified
Lahore Laboratory
Federal-EPA Certified
Islamabad Laboratory

Meteorological Data

Job Reference Number	GCEC-PK-154/2022
Monitoring Point	Near Nasirpur Railway Station
Date of Intervention	08-June-2022 to 09-June-2022
Monitoring Coordinates	34°01'05.9"N 71°40'40.4"E

Time	Ambient Temperature °C	Wind Direction	Wind Velocity m/s	Humidity %	Pressure (mm of Hg)
9:00	35	SW	2.2	23	755.4
10:00	37	SW	2.3	20	754.2
11:00	39	SW	4.2	16	754.2
12:00	42	SW	2.3	10	751.2
13:00	43	SW	2.3	10	753.2
14:00	43	N	4.4	9	753.2
15:00	43	N	2.1	9	749.8
16:00	44	N	2.3	8	749.5
17:00	43	N	2.4	8	751.2
18:00	43	N	3.1	7	753.5
19:00	43	NE	3.3	6	749.4
20:00	40	NE	3.1	9	751.2
21:00	38	NE	3.3	12	753.1
22:00	36	NE	3.2	16	750.2
23:00	34	NE	3.2	20	749.4
0:00	33	W	3.3	22	753.4
1:00	30	W	2.4	33	749.5
2:00	30	W	3.1	33	752.3
3:00	28	W	3.3	36	753.5
4:00	28	W	4.1	37	751.2
5:00	26	W	2.6	37	753.2
6:00	27	NE	2.7	38	751.2
7:00	30	NE	2.4	32	751.8
8:00	34	NE	2.8	30	749.5

E(QA)



Green Crescent
Environmental Consultants (Pvt) Ltd.



Punjab-EPA Certified
Lahore Laboratory
Federal-EPA Certified
Islamabad Laboratory

Noise Level Monitoring Report

Job Reference Number	GCFC-PK-154/2022
Monitoring Point	Near Nasirpur Railway Station
Date of Intervention	08-June-2022 to 09-June-2022
Monitoring Coordinates	34°01'05.9"N 71°40'40.4"E

Sr. #	Time	Method/Technique	Unit	Results	NEQS
				LA _{avg}	(Commercial)
Night Time					
1.	23:00	Noise Meter	dB	54.8	55.0
2.	00:00	Noise Meter	dB	55.3	
3.	01:00	Noise Meter	dB	54.6	
4.	02:00	Noise Meter	dB	53.9	
5.	03:00	Noise Meter	dB	54.8	
6.	04:00	Noise Meter	dB	54.1	
7.	05:00	Noise Meter	dB	54.4	
8.	06:00	Noise Meter	dB	54.8	
Night Time Average				54.59	55.0
Day Time					
9.	07:00	Noise Meter	dB	63.1	65.0
10.	08:00	Noise Meter	dB	62.4	
11.	09:00	Noise Meter	dB	64.3	
12.	10:00	Noise Meter	dB	62.9	
13.	11:00	Noise Meter	dB	64.3	
14.	12:00	Noise Meter	dB	63.6	
15.	13:00	Noise Meter	dB	64.3	
16.	14:00	Noise Meter	dB	63.9	
17.	15:00	Noise Meter	dB	63.5	
18.	16:00	Noise Meter	dB	64.7	
19.	17:00	Noise Meter	dB	63.1	
20.	18:00	Noise Meter	dB	64.2	
21.	19:00	Noise Meter	dB	63.5	
22.	20:00	Noise Meter	dB	62.7	
23.	21:00	Noise Meter	dB	63.8	
24.	22:00	Noise Meter	dB	54.3	
Day Time Average				63.04	65.0

E(QA)



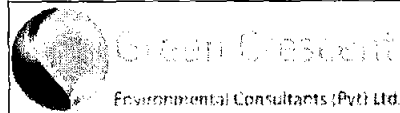
Green Crescent
Environmental Consultants (Pvt) Ltd.



Punjab-EPA Certified
Lahore Laboratory
Federal-EPA Certified
Islamabad Laboratory

Ambient Air & Noise Monitoring
Location-03
Near Askari Pump
(Peshawar)





Punjab-EPA Certified
Lahore Laboratory
Federal-EPA Certified
Islamabad Laboratory

Ambient Air Quality Monitoring

Job Reference Number	GCTC-PK-154/2022
Monitoring Point	Near Askari Pump
Date of Intervention	09-June-2022 to 10-June-2022
Monitoring Coordinates	34°00'37.4"N 71°55'59.7"E

Sr. #	Time	CO (mg/m ³)	NO (µg/m ³)	NO ₂ (µg/m ³)	NO _x (µg/m ³)	SO ₂ (µg/m ³)
1.	9:00	2.27	17.9	25.43	43.33	26.76
2.	10:00	2.21	15.56	26.21	41.77	25.08
3.	11:00	2.87	18.68	25.21	43.89	24.54
4.	12:00	2.32	16.86	23.96	40.82	23.87
5.	13:00	2.34	16.54	26.54	43.08	24.56
6.	14:00	2.17	17.45	27.07	44.52	23.23
7.	15:00	2.24	15.65	26.86	42.51	24.6
8.	16:00	2.56	17.11	24.32	41.43	25.47
9.	17:00	2.96	14.65	26.07	40.72	20.86
10.	18:00	2.12	18.08	27.02	45.03	26.09
11.	19:00	2.45	14.23	25.09	39.32	24.55
12.	20:00	1.99	17.33	25.93	43.26	21.68
13.	21:00	1.87	16.55	24.89	41.44	22.34
14.	22:00	2.01	18.86	23.23	42.09	24.95
15.	23:00	1.65	14.23	22.17	36.4	21.23
16.	00:00	1.95	15.87	23.12	38.99	22.12
17.	1:00	2.31	15.97	22.34	38.31	19.87
18.	2:00	1.98	14.34	21.29	35.63	22.08
19.	3:00	2.09	15.76	24.23	39.99	23.12
20.	4:00	1.87	13.45	18.21	31.66	21.87
21.	5:00	1.85	16.56	23.87	40.43	26.44
22.	6:00	2.22	17.86	23.12	40.98	25.56
23.	7:00	2.65	16.65	24.32	40.97	24.76
24.	8:00	2.34	17.98	24.34	42.32	24.34
Average Concentration		2.22	16.42	25.44	40.79	23.75

E(QA)



Green Crescent
Environmental Consultants (Pvt) Ltd.




Punjab-EPA Certified
Lahore Laboratory
Federal-EPA Certified
Islamabad Laboratory

Meteorological Data


Job Reference Number	GCEC-PK-154/2022
Monitoring Point	Near Askari Pump
Date of Intervention	09-June-2022 to 10-June-2022
Monitoring Coordinates	34°00'37.4"N 71°55'59.7"E

Time	Ambient Temperature °C	Wind Direction	Wind Velocity m/s	Humidity %	Pressure (mm of Hg)
9:00	35	N	2.1	23	752.2
10:00	37	N	2.3	20	751.2
11:00	41	N	4.2	16	750.4
12:00	42	N	4.1	10	758.2
13:00	43	N	4.2	10	751.9
14:00	44	N	4.4	9	752.3
15:00	45	NE	2.3	9	753.8
16:00	42	NE	2.1	8	750.3
17:00	41	NE	2.4	8	752.4
18:00	39	NE	3.1	7	751.2
19:00	38	W	3.3	6	749.4
20:00	37	W	2.6	9	751.2
21:00	37	W	1.4	12	753.1
22:00	36	SW	2.3	16	750.2
23:00	34	SW	2.4	20	749.4
00:00	33	SW	2.1	22	748.3
1:00	30	SW	2.4	33	749.5
2:00	27	SW	3.1	33	750.4
3:00	27	N	3.3	36	750.1
4:00	26	N	4.1	37	749.3
5:00	27	N	4.3	37	749.4
6:00	28	N	4.1	38	751.3
7:00	29	N	1.9	32	751.8
8:00	32	N	2.4	30	749.5

E(QA)



Green Crescent
Environmental Consultants (Pvt) Ltd



Punjab-EPA Certified
Lahore Laboratory
Federal-EPA Certified
Islamabad Laboratory

Noise Level Monitoring Report

Job Reference Number	GCHC-PK-154/2022
Monitoring Point	Near Askari Pump
Date of Intervention	09-June-2022 to 10-June-2022
Monitoring Coordinates	34°00'37.4"N 71°55'59.7"E

Sr. #	Time	Method/Technique	Unit	Results	NEQS
				LAavg	(Commercial)
Night Time					
1.	23:30	Noise Meter	dB	54.3	55.0
2.	00:30	Noise Meter	dB	55.3	
3.	01:30	Noise Meter	dB	56.2	
4.	02:30	Noise Meter	dB	52.3	
5.	03:30	Noise Meter	dB	54.3	
6.	04:30	Noise Meter	dB	53.6	
7.	05:30	Noise Meter	dB	54.3	
8.	06:30	Noise Meter	dB	52.5	
Night Time Average			dB	54.10	55.0
Day Time					
9.	07:30	Noise Meter	dB	63.4	65.0
10.	08:30	Noise Meter	dB	64.7	
11.	09:30	Noise Meter	dB	66.2	
12.	10:30	Noise Meter	dB	64.2	
13.	11:30	Noise Meter	dB	65.7	
14.	12:30	Noise Meter	dB	67.2	
15.	13:30	Noise Meter	dB	64.3	
16.	14:30	Noise Meter	dB	65.1	
17.	15:30	Noise Meter	dB	61.2	
18.	16:30	Noise Meter	dB	63.8	
19.	17:30	Noise Meter	dB	63.6	
20.	18:30	Noise Meter	dB	64.3	
21.	19:30	Noise Meter	dB	64.9	
22.	20:30	Noise Meter	dB	64.1	
23.	21:30	Noise Meter	dB	63.2	
24.	22:30	Noise Meter	dB	54.9	
Day Time Average			dB	63.80	65.0

E(QA)

1. Title of the Report
Environmental Impact Study

Reference Number: GCEC-PK-154/2022

PICTORIAL EVIDENCE OF
ENVIRONMENTAL
MONITORING



Figure 1: Drinking Water Sampling of Attock Pump Amangarh Village



Figure 2: Drinking Water Sampling of Maqbol Property Dealer, Pabbi



Figure 3: Drinking Water Sampling of Taru Jabba Katub Centre, Taru Jabba



Figure 4: Waste Water Sampling of Near Attock Pump, Amangarh

DRAFT



Figure 5: Waste Water Sampling of Drain Near HP13 Mosque



Figure 6: Surface Water Sampling of Canal Tarnab, Peshawar



Figure 7: Ambient Air Monitoring of Near Makkah Medical Centre



Figure 8: Ambient Air Monitoring of Near Nasirpur Railway Station

ANNEX-I

Green Crescent
Environmental Consultant (Pvt) Ltd.

Reference Number: GCEC-PK-154/2022


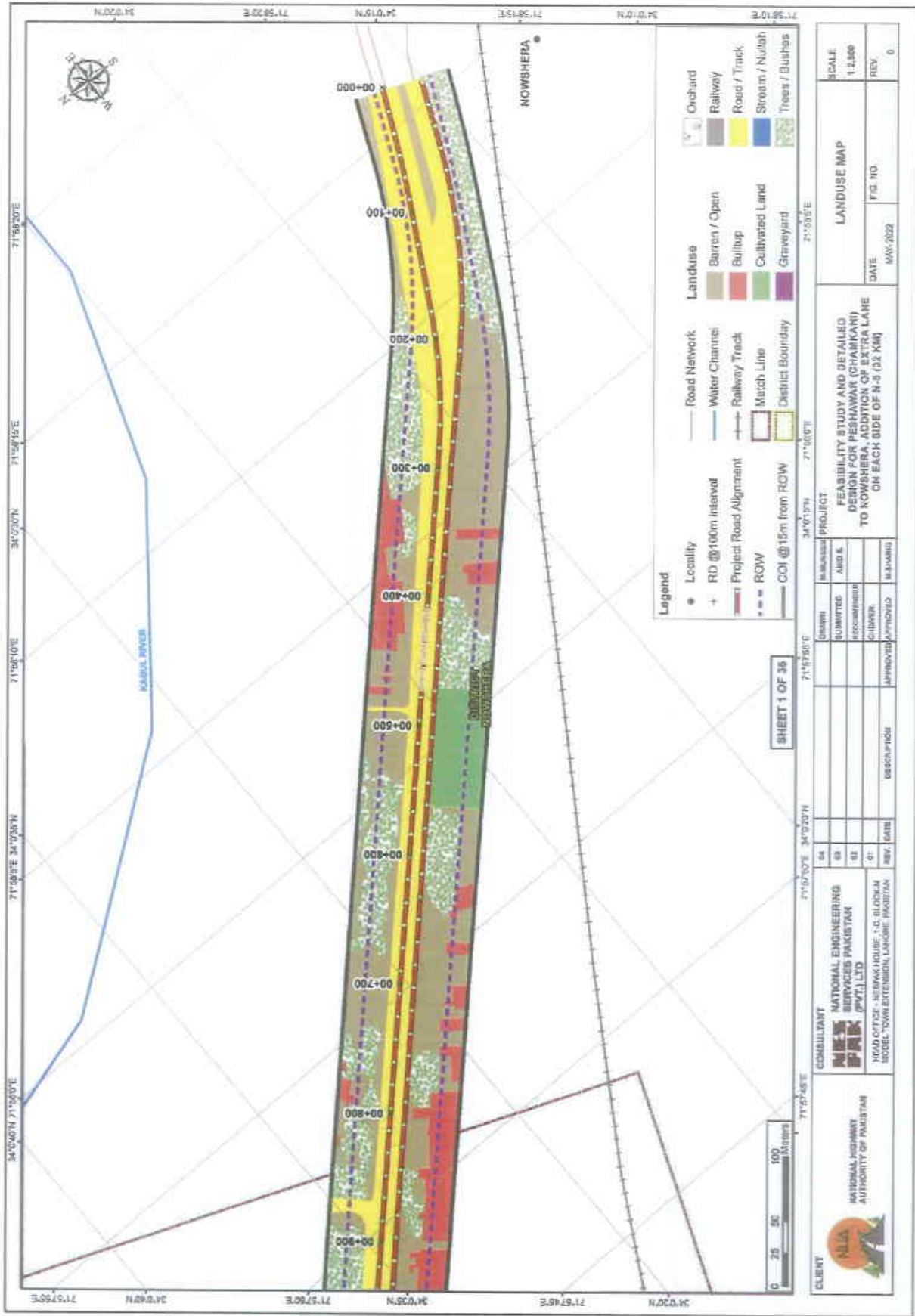


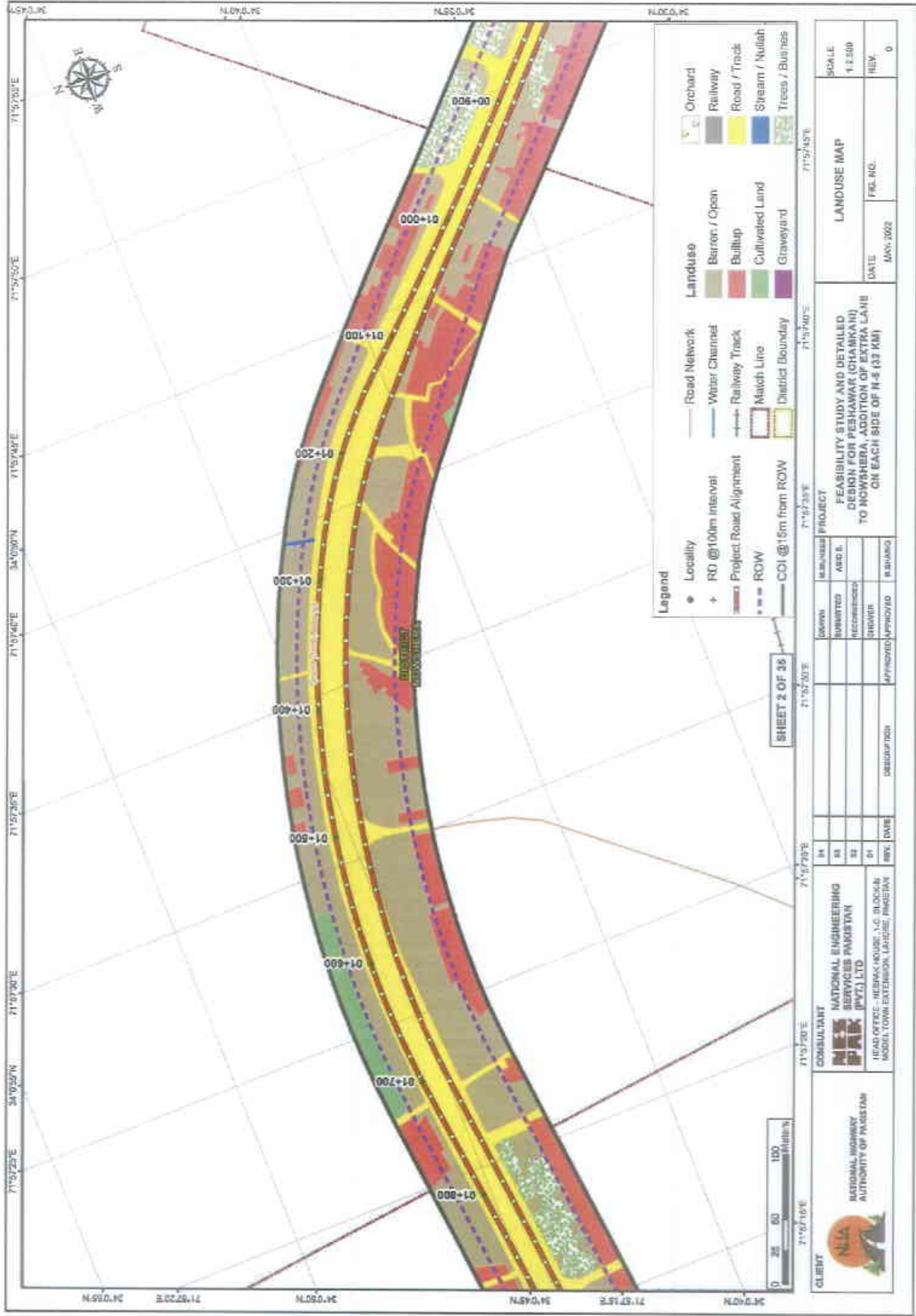
Figure 9: Ambient Air Monitoring of Near Askari Pump

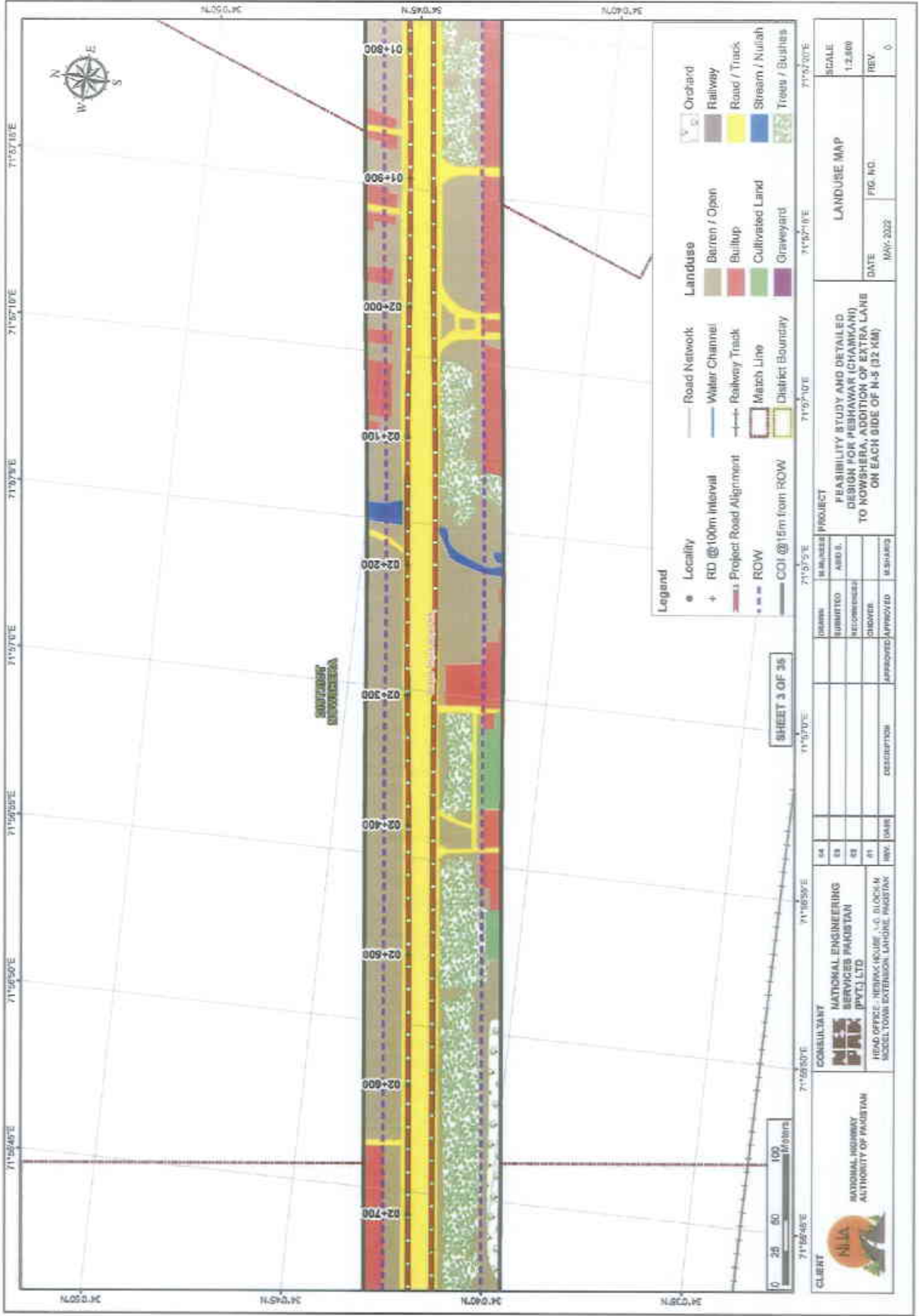
End of Report

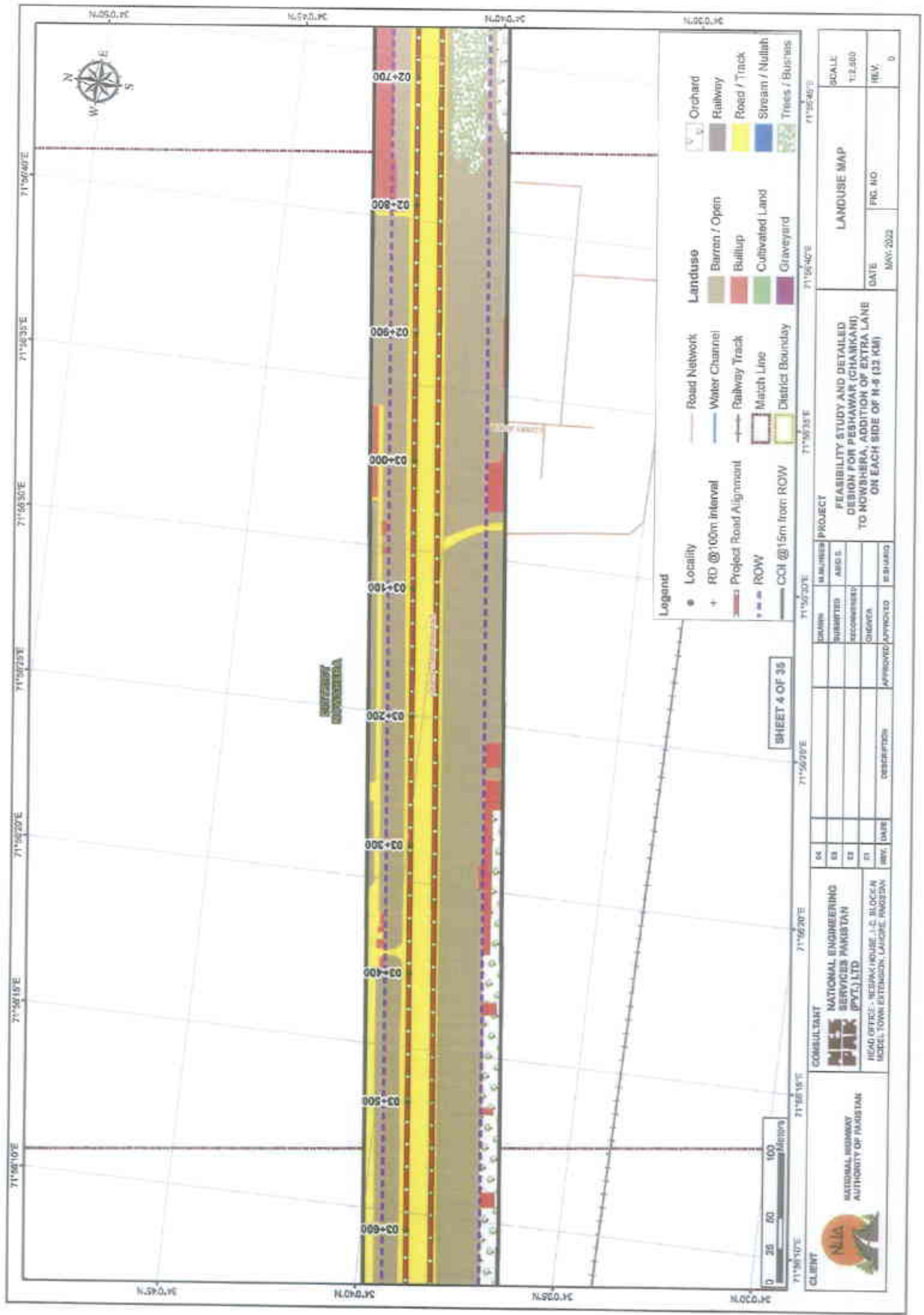


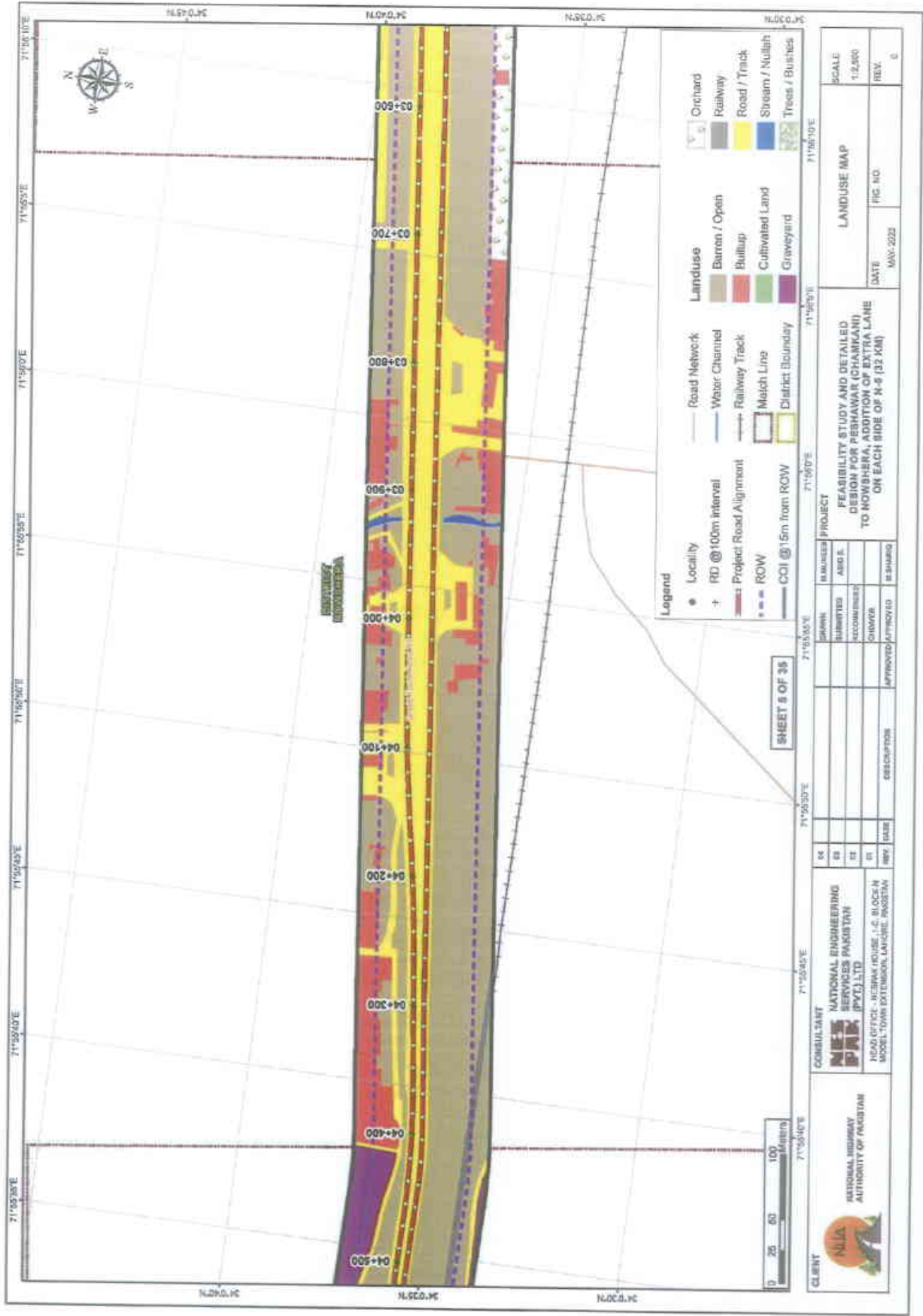
SHEET 1 OF 35

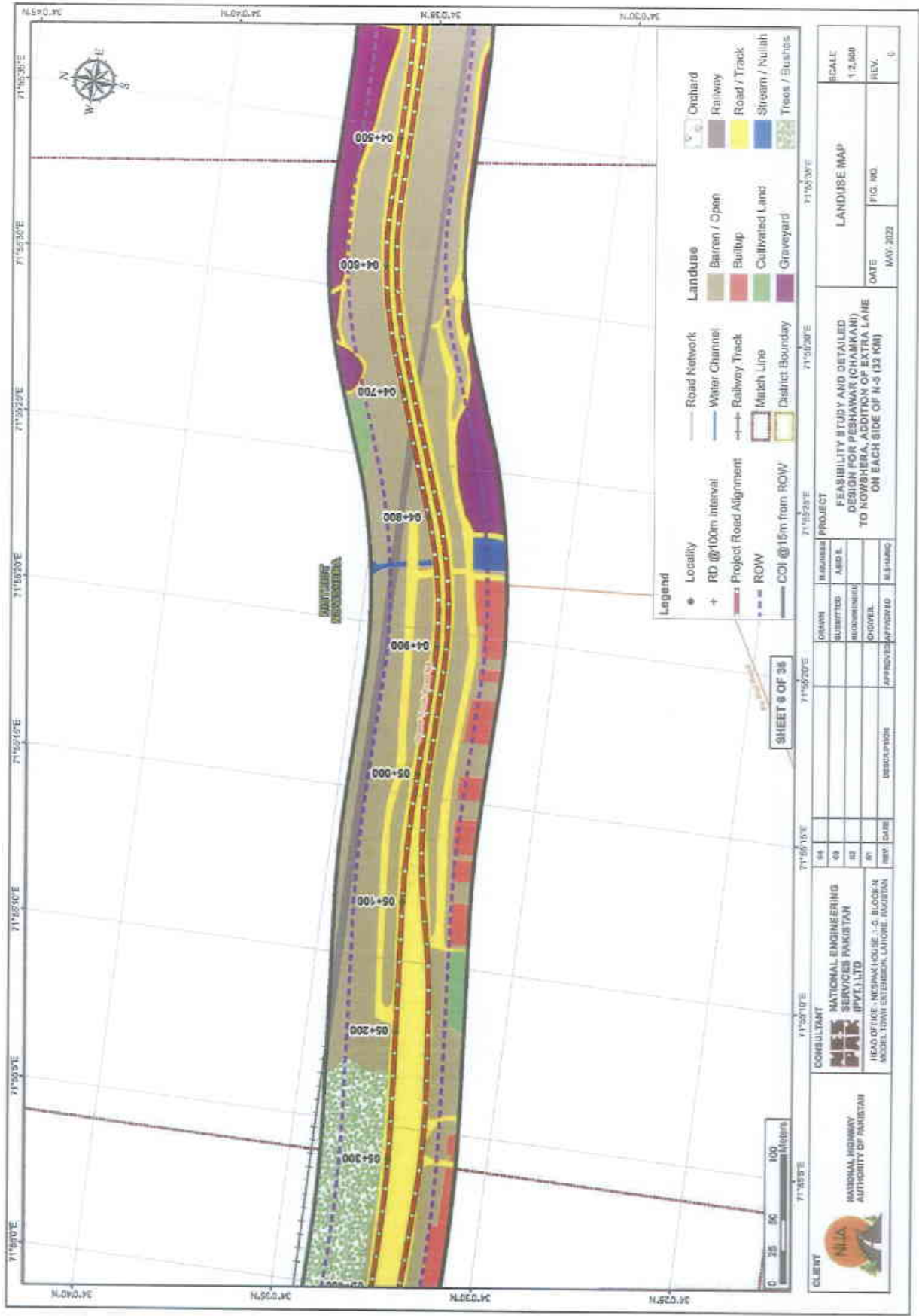
 NATIONAL ENGINEERING SERVICES PAKISTAN (NESPAK) NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD HEAD OFFICE: NEDRA HOUSE, 115, BLOCK 11 MODEL TOWN EXTENSION, LAHORE, PAKISTAN	CLIENT NATIONAL AUTHORITY OF PAKISTAN	CONSULTANT NATIONAL ENGINEERING SERVICES PAKISTAN (NESPAK) NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD HEAD OFFICE: NEDRA HOUSE, 115, BLOCK 11 MODEL TOWN EXTENSION, LAHORE, PAKISTAN	NO. DATE 01 01 02 02 03 03 04 04	REV. DATE 01 01 02 02 03 03 04 04	APPROVED _____ M. JAMALI	DESIGNER _____ M. JAMALI	SUBMITTED FOR APPROVAL _____ M. JAMALI	APPROVED _____ M. JAMALI	PROJECT FEASIBILITY STUDY AND DETAILED DESIGN FOR PESHAWAR (CHANKARI) TO NOWBHERA, ADDITION OF EXTRA LAINE ON EACH SIDE OF N-3 (32 KM)	LANDUSE MAP FIG. NO. _____ DATE MAY-2022	SCALE 1:1,500 REV. 0
--	---	---	--	---	--------------------------------	--------------------------------	--	--------------------------------	---	--	----------------------------





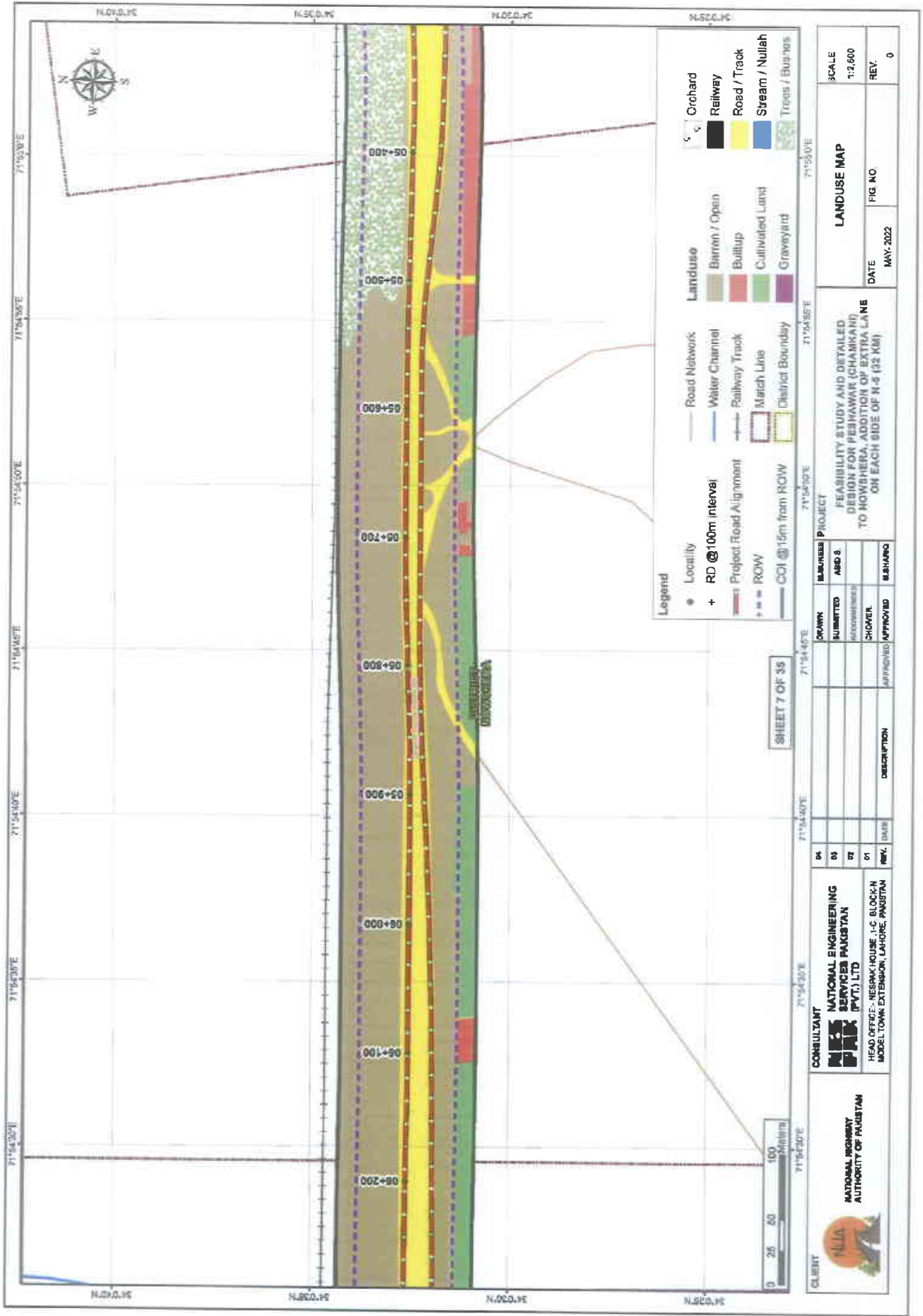


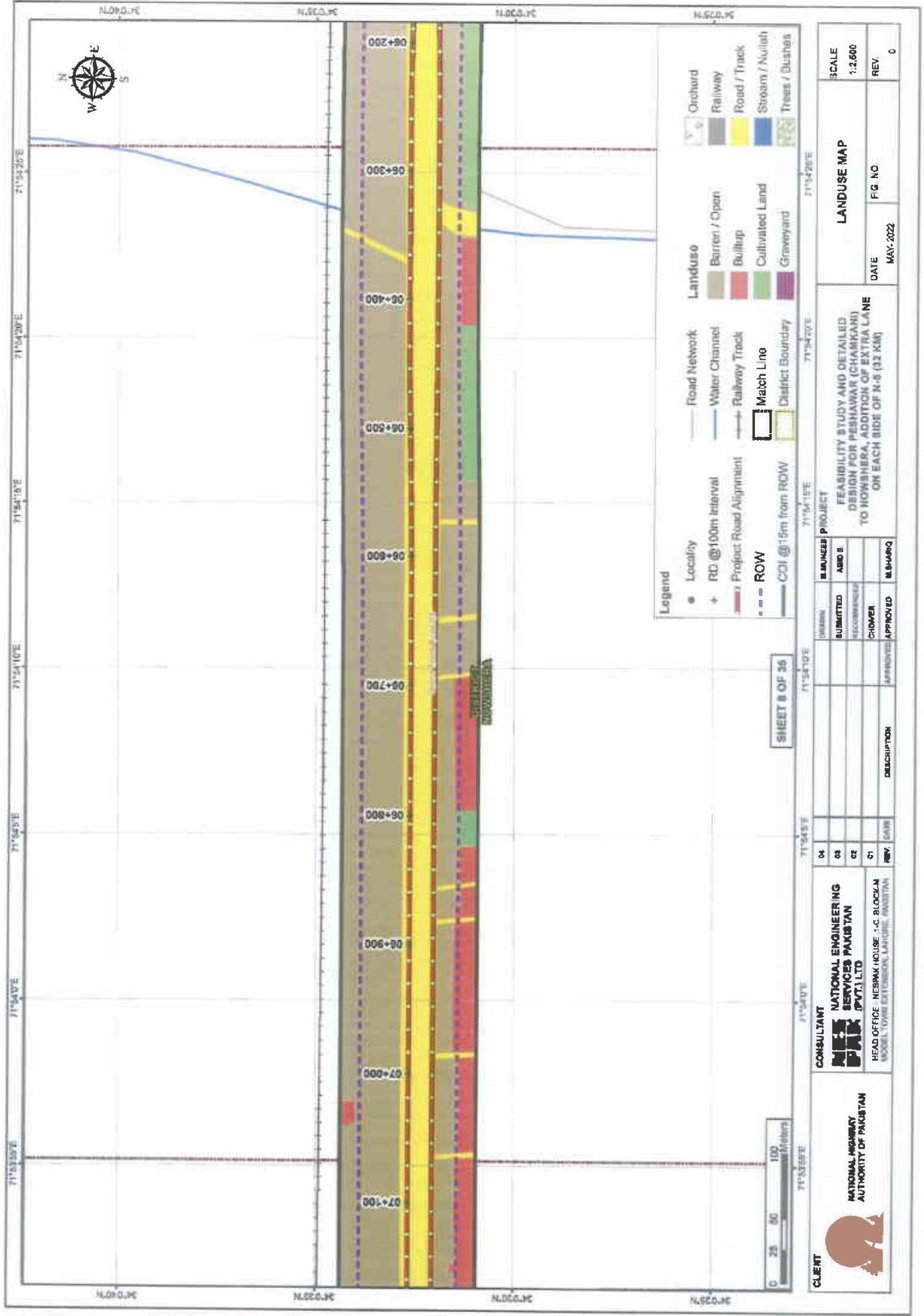


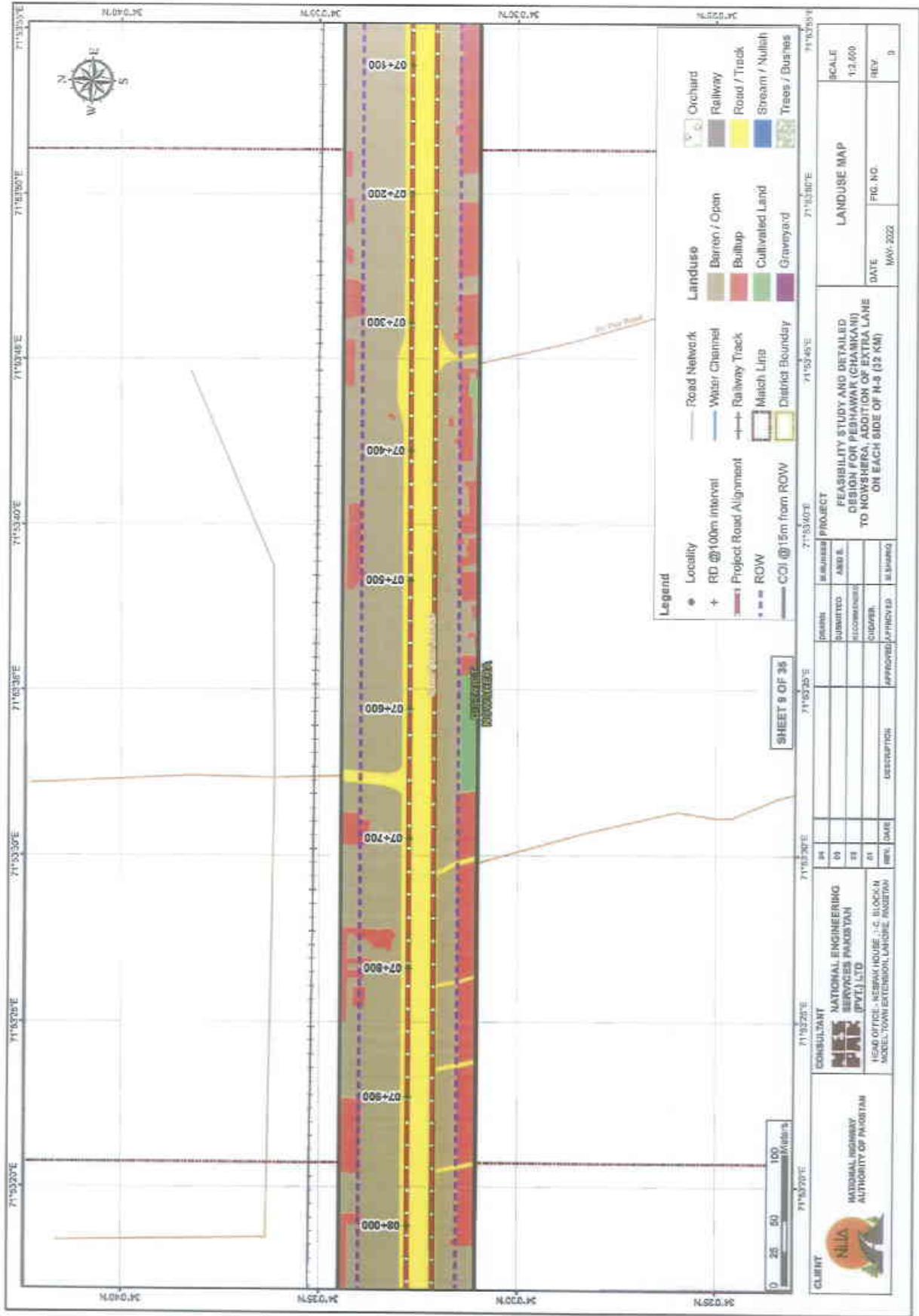


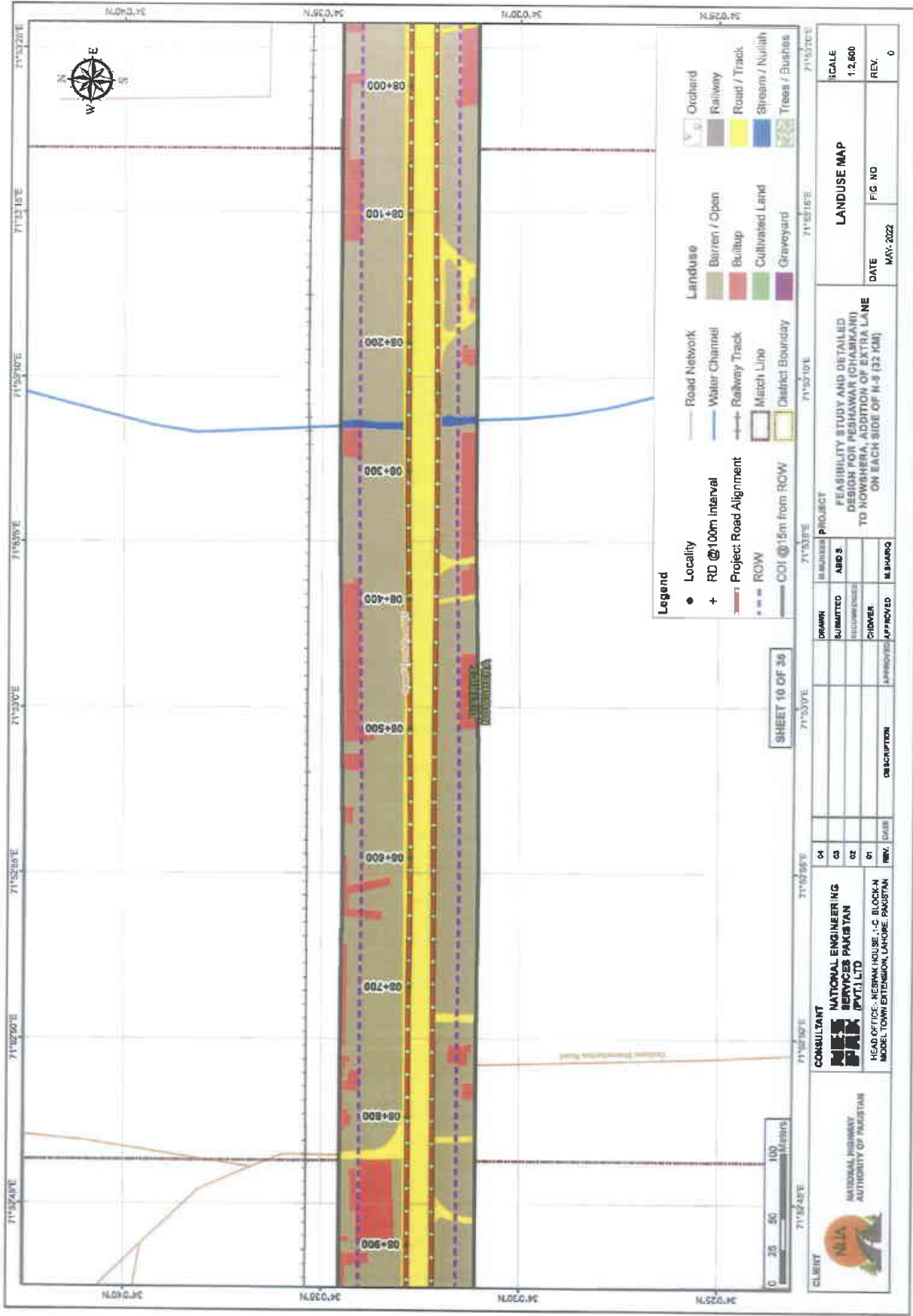


 NATIONAL HIGHWAY AUTHORITY OF PAKISTAN	CONSULTANT  NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE - NISHA HOUSE - I.C. BLOCK-N MODEL TOWN EXTENSION, LAHORE, PAKISTAN		DRAWN SUBMITTED APPROVED CHECKED APPROVED		SHEET 6 OF 38	
	CLERK	PROJECT FEASIBILITY STUDY AND DETAILED DESIGN FOR PESHAWAR (CHANKANI) TO NOWSHERA - ADDITION OF EXTRA LANE ON EACH SIDE OF N-5 (32 KM)	REVISION NO. 01 DATE 05/05/2022	SCALE 1:2,500	FIG. NO.	REV.









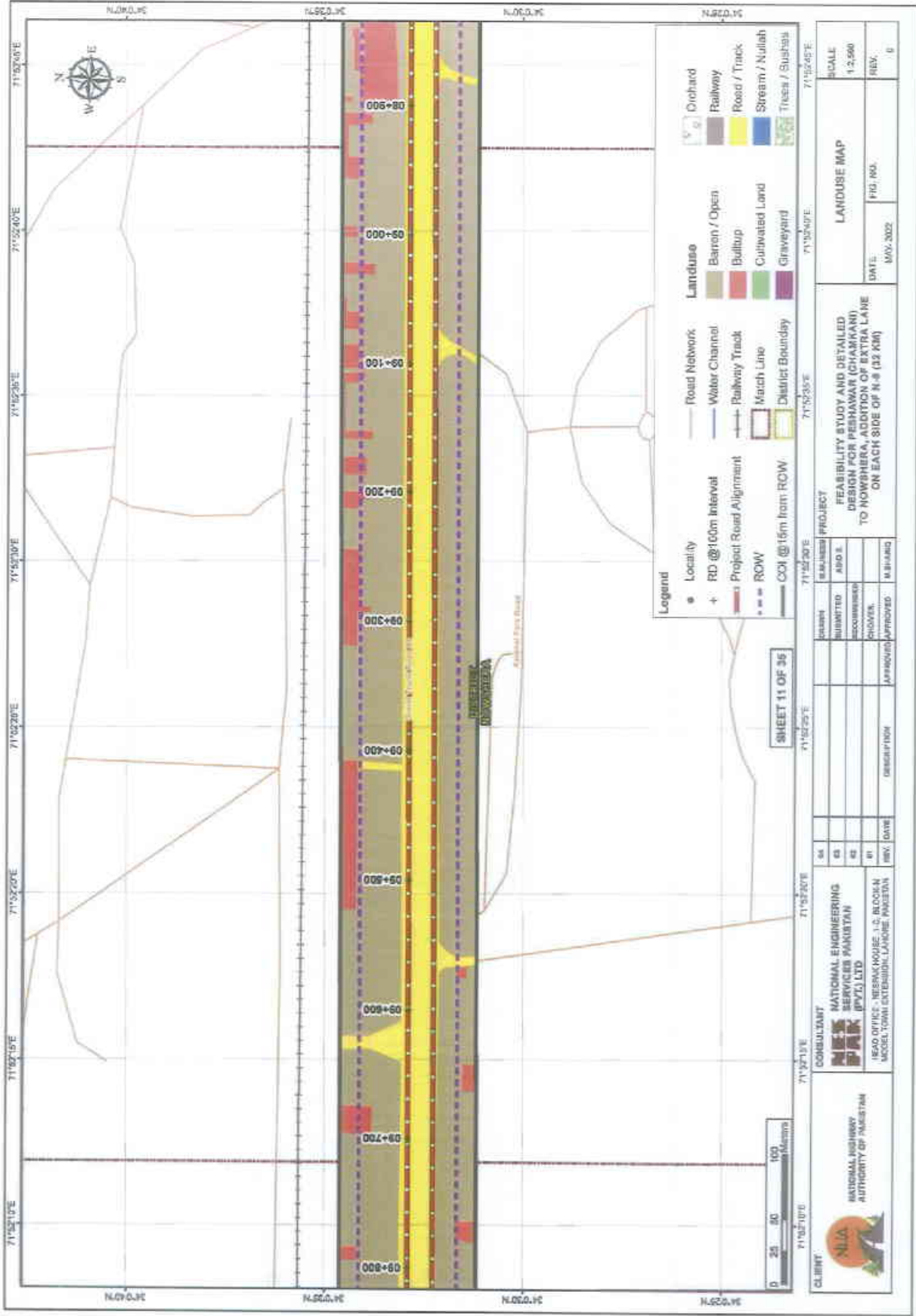
Legend

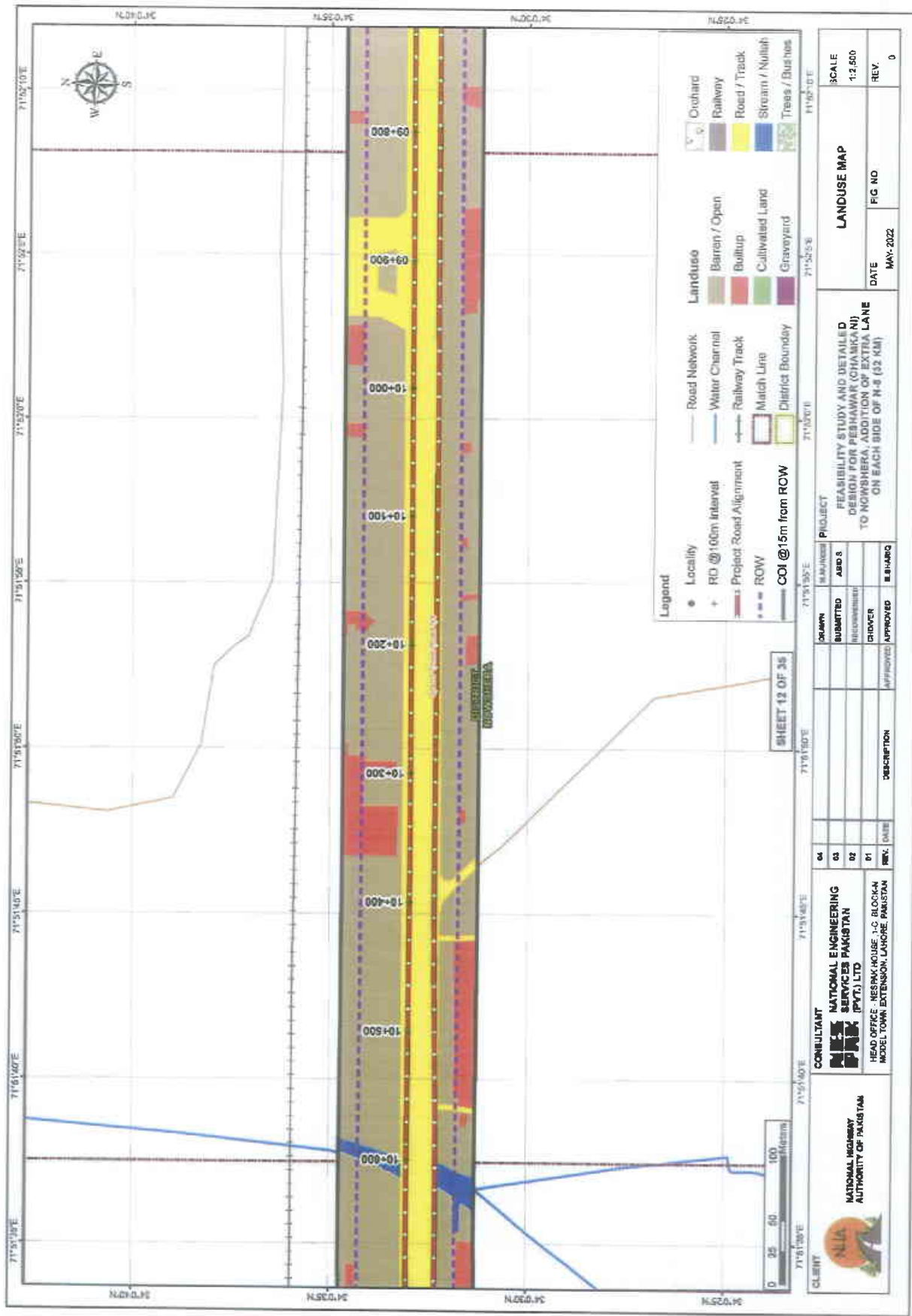
- Locality
- + RD @100m interval
- Road Network
- Water Channel
- Railway Track
- Match Line
- District Boundary
- COI @15m from ROW

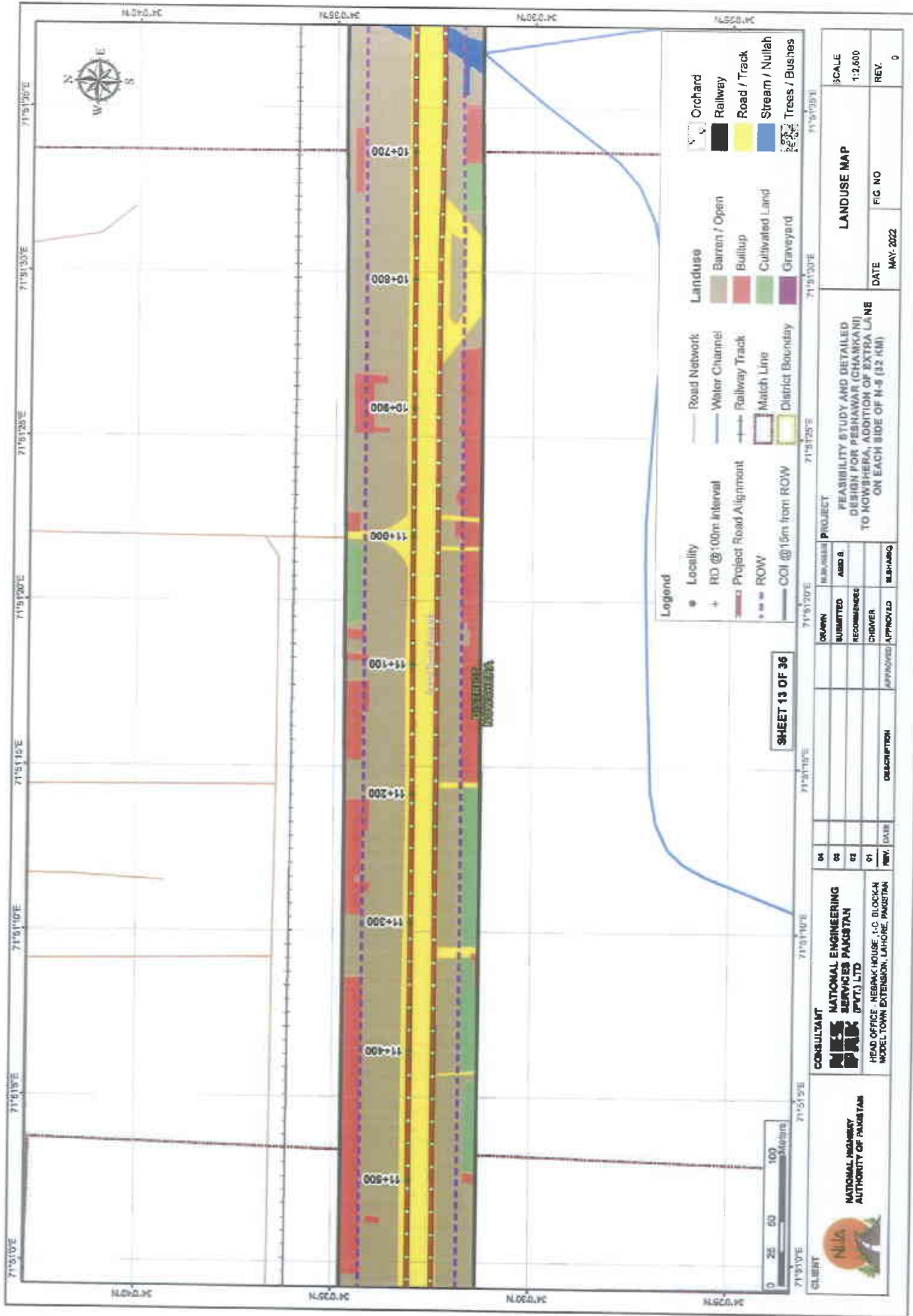
Landuse

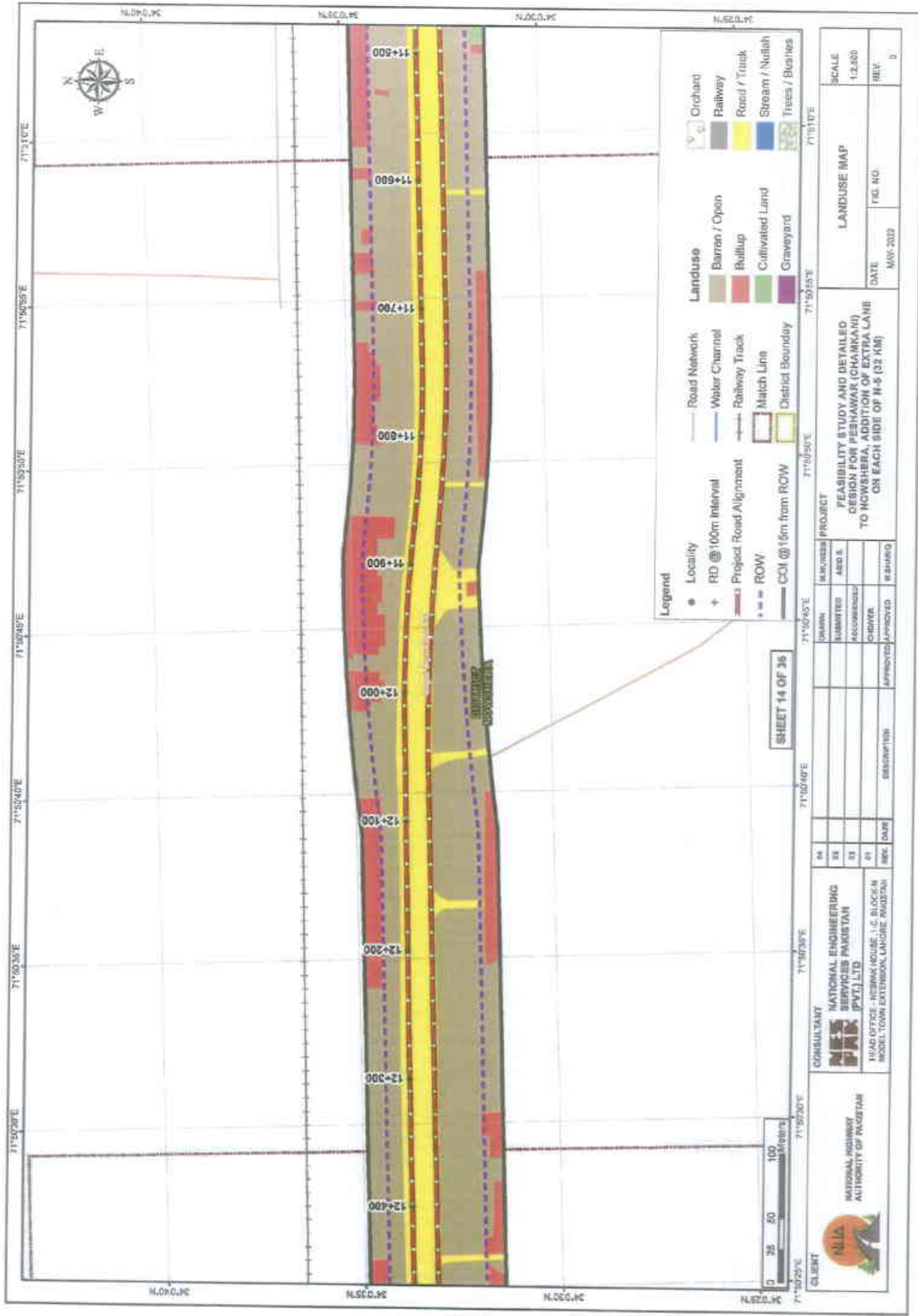
- Barren / Open
- Builtup
- Cultivated Land
- Graveyard
- Orchard
- Railway
- Road / Track
- Stream / Nuliah
- Trees / Bushes

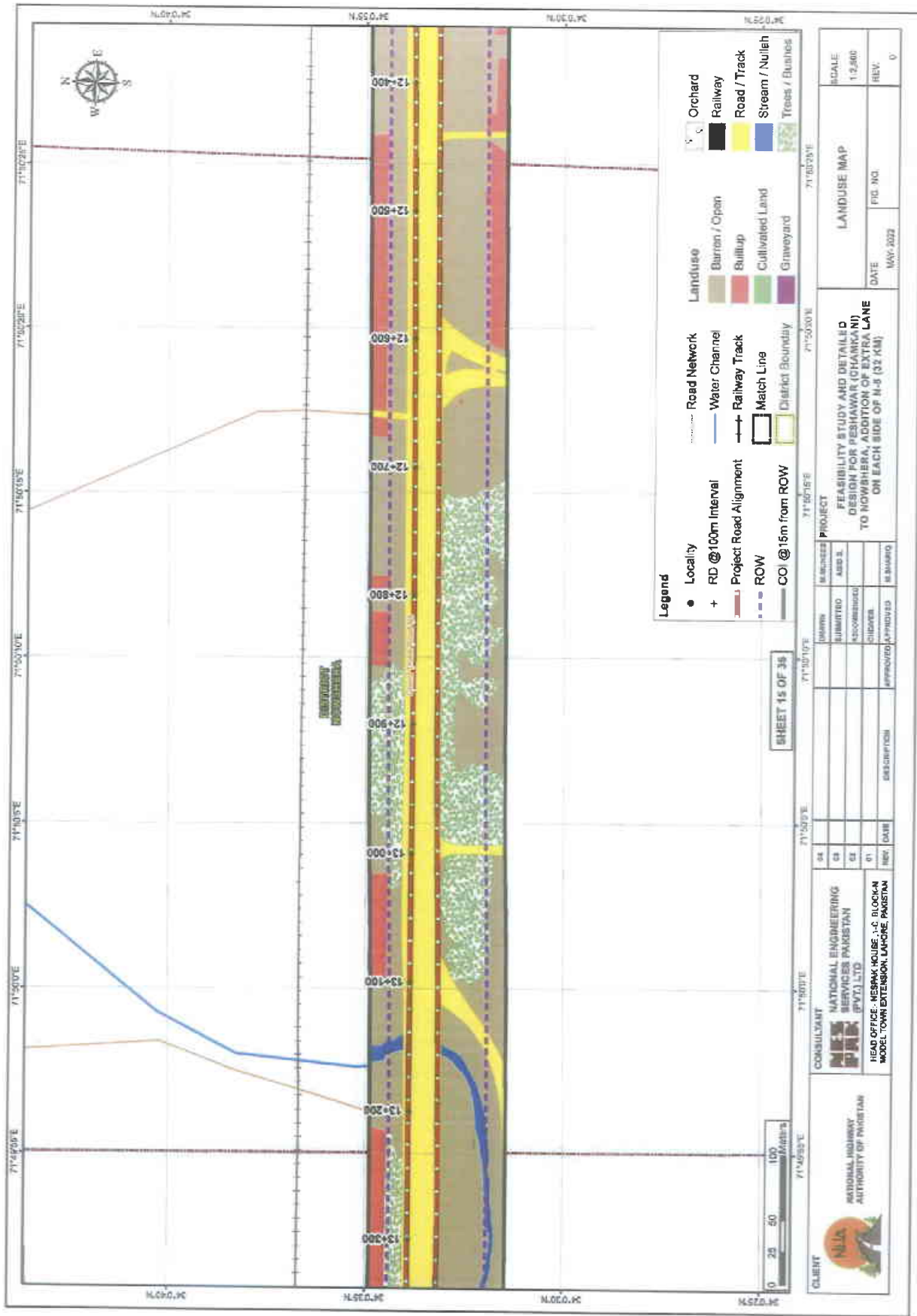
<p>CLIENT NATIONAL HIGHWAY AUTHORITY OF PAKISTAN</p>	<p>CONSULTANT NATIONAL ENGINEERING SERVICES PAKISTAN PVT. LTD HEAD OFFICE: NERANK HOUSE, 1-C BLOCK-N MODEL TOWN EXTENSION, LAHORE, PAKISTAN</p>	<p>DESIGNER</p>	<p>APPROVED</p>	<p>DESCRIPTION</p>	<p>REV. DATE</p>	<p>M.BHARQ</p>
		<p>SUBMITTED</p>	<p>APPROVED</p>			
		<p>CHIEF ENGINEER</p>	<p>APPROVED</p>			
<p>PROJECT FEASIBILITY STUDY AND DETAILED DESIGN FOR PESHAWAR (CHAKKANI) TO NOWSHERA, ADDITION OF EXTRA LANE ON EACH SIDE OF H-3 (32 KM)</p>		<p>DATE MAY, 2022</p>		<p>FIG. NO.</p>		<p>SCALE 1:2,600</p>
						<p>REV. 0</p>

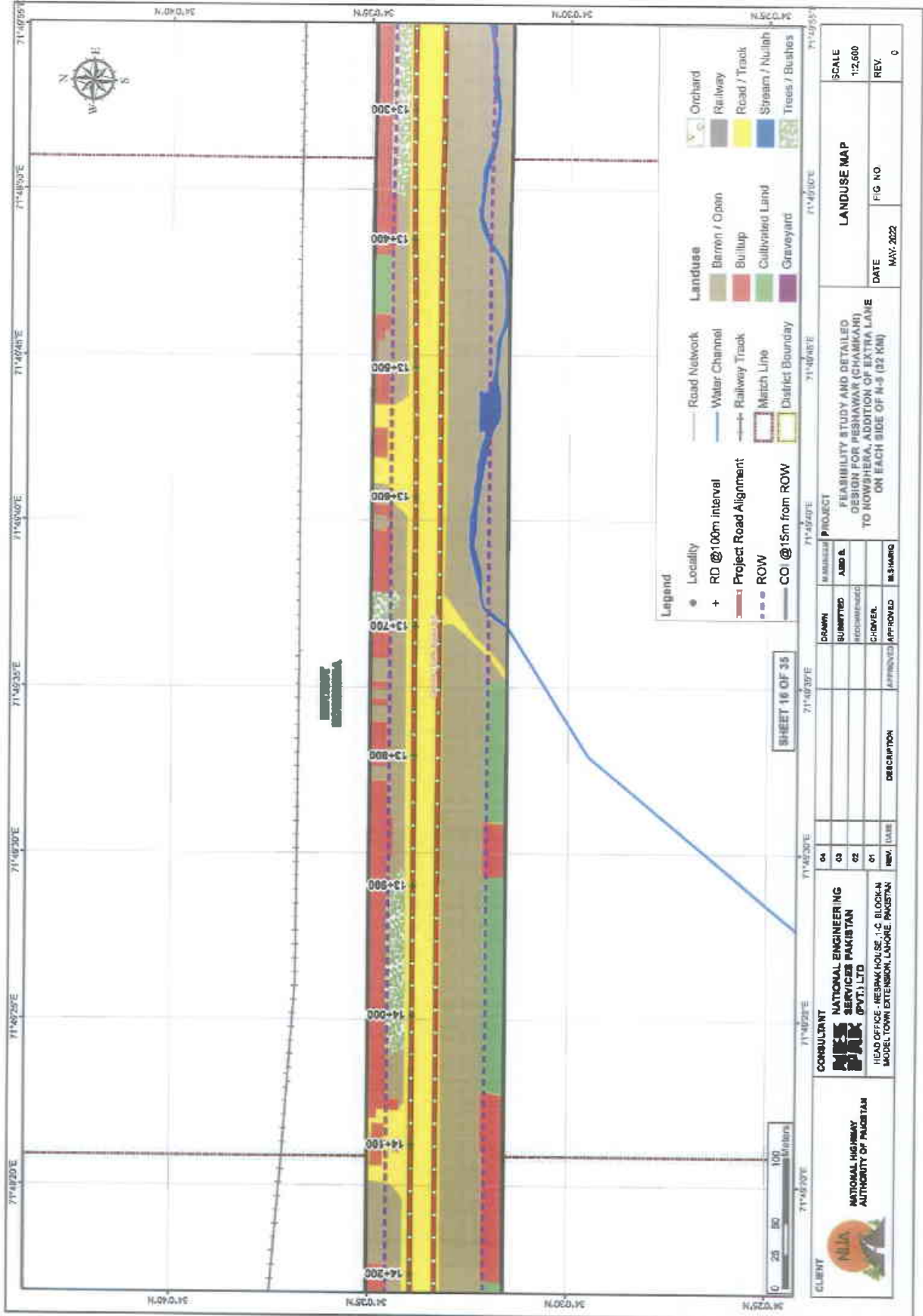












CLIENT  NATIONAL HIGHWAY AUTHORITY OF PAKISTAN	CONSULTANT  NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD HEAD OFFICE - NESPAK HOUSE 1-C BLOCK N MODEL TOWN EXTENSION, LAHORE, PAKISTAN		PROJECT FEASIBILITY STUDY AND DETAILED DESIGN FOR RESPAKAR (CHAMKARI) TO NOWSHERA, ADDITION OF EXTRA LAKE ON EACH SIDE OF M-5 (82 KM)		LANDUSE MAP	
	SCALE 1:2,600	DATE MAY-2022	FIG NO	REV 0		

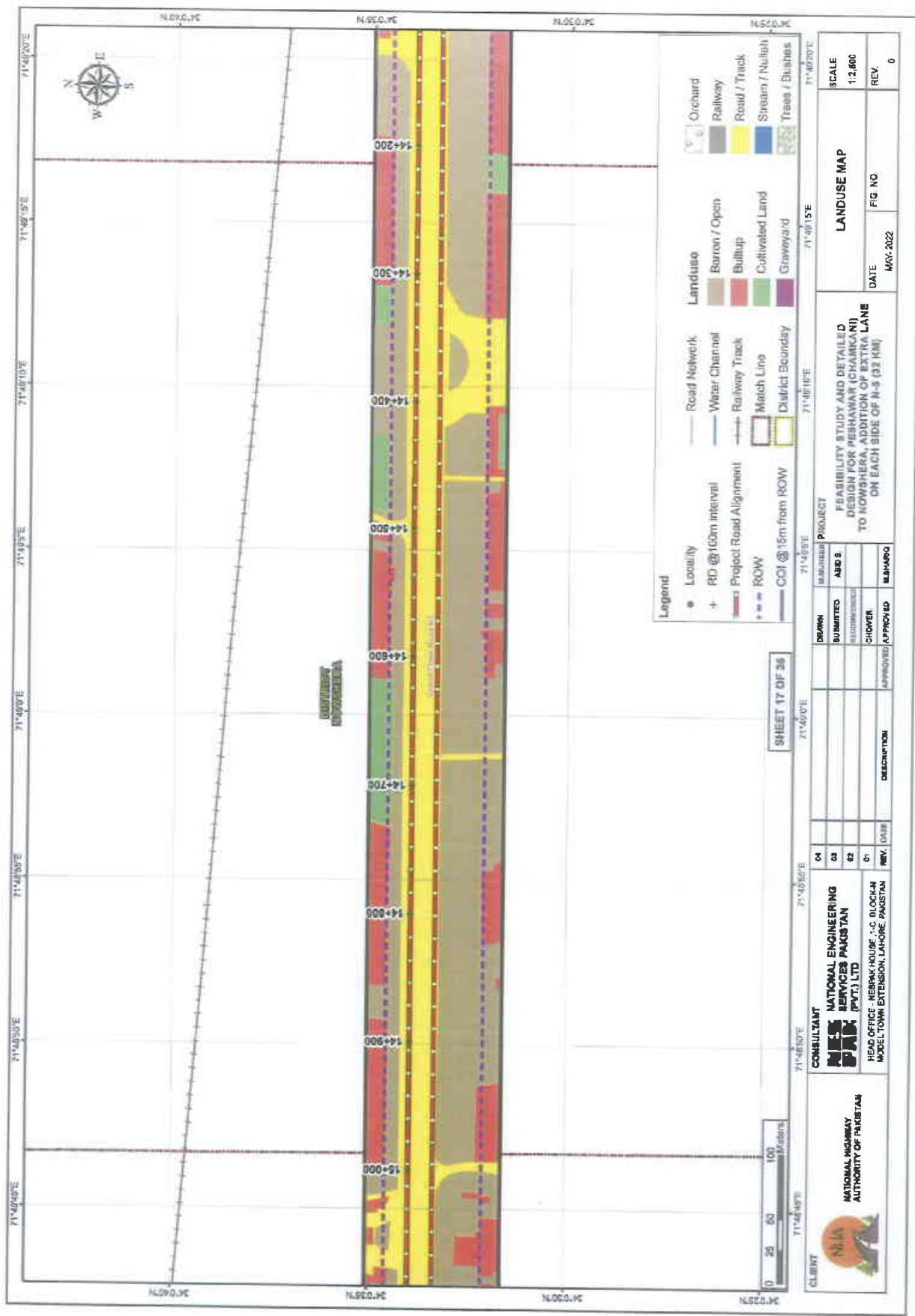
Legend

● Locality	— Road Network	Orchard
+ RD @100m Interval	— Water Channel	Railway
— Project Road Alignment	—+ Railway Track	Road / Trunk
— ROW	—+ Match Line	Stream / Nullah
— COI @15m from ROW	—+ District Boundary	Trees / Bushes


Landuse	Barren / Open	Orchard
Bullup	Cultivated Land	Railway
Graveyard		Road / Trunk

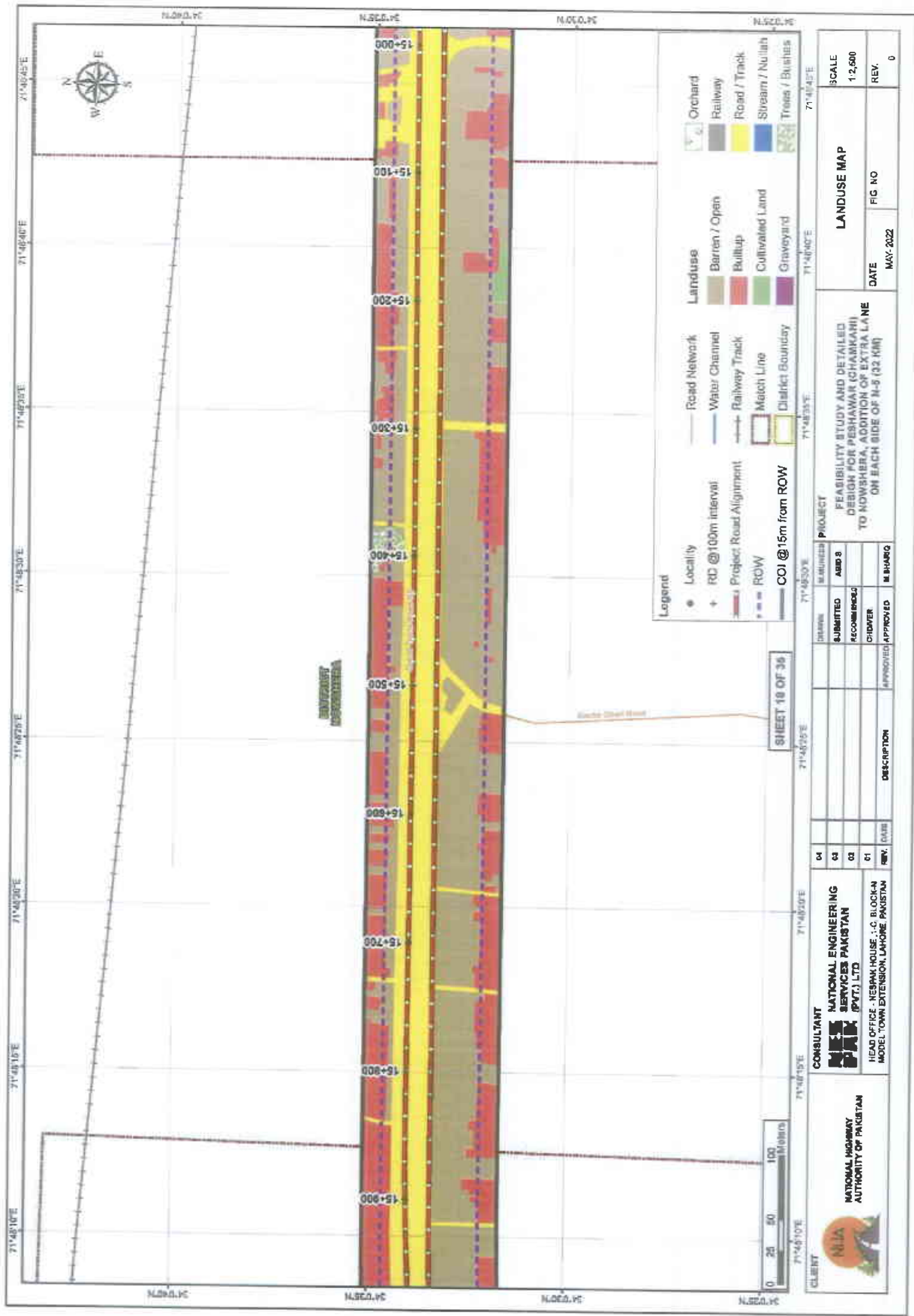
SHEET 16 OF 35



0 25 50 100 Meters



SHEET 17 OF 36

 NATIONAL HIGHWAY AUTHORITY OF PAKISTAN	CONSULTANT MES NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD HEAD OFFICE: AERBKHOUSE, J.C. BLOCK-4 MODEL TOWN EXTENSION, LAHORE, PAKISTAN		01 02 03 04	01 02 03 04	REV. DATE	DATE MAY-2022	FIG NO 0	SCALE 1:2,600	LAND USE MAP
	PROJECT FEASIBILITY STUDY AND DETAILED DESIGN FOR PEHAWAR (CHAMKANI) TO NOWSHERA, ADDITION OF EXTRA LANES ON EACH SIDE OF N-3 (33 KM)			SUBMITTED APPROVED APPROVED	SUBMITTED APPROVED APPROVED	DATE MAY-2022	FIG NO 0	SCALE 1:2,600	LAND USE MAP



 NATIONAL HIGHWAY AUTHORITY OF PAKISTAN		CONSULTANT  NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD HEAD OFFICE - NESPAK HOUSE - I.C. BLOCK-N MODEL TOWN EXTENSION, LAHORE, PAKISTAN		04 03 02 01	REV. DATE	DESCRIPTION	APPROVED/NOT APPROVED	M.B. NO.	PROJECT	DATE	FIG. NO.	SCALE
									FEASIBILITY STUDY AND DETAILED DESIGN FOR PESHAWAR (GHAKHANI) TO NOWSHERA, ADDITION OF EXTRA LANE ON EACH SIDE OF N-5 (22 KM)	MAY-2022		1:2,500
												REV. 0



0 25 50 100
Meters

SHEET 19 OF 38

CLIENT



NATIONAL HIGHWAY
AUTHORITY OF PAKISTAN

CONSULTANT

**NATIONAL ENGINEERING
SERVICES PAKISTAN
(PVT) LTD**

HEAD OFFICE: REHMAN-RHUBE, I.C. BLOCK N
MODEL TOWN EXTENSION, LAHORE, PAKISTAN

NO	REV. DATE	DESCRIPTION	APPROVED	REVISION
01				
02				
03				
04				

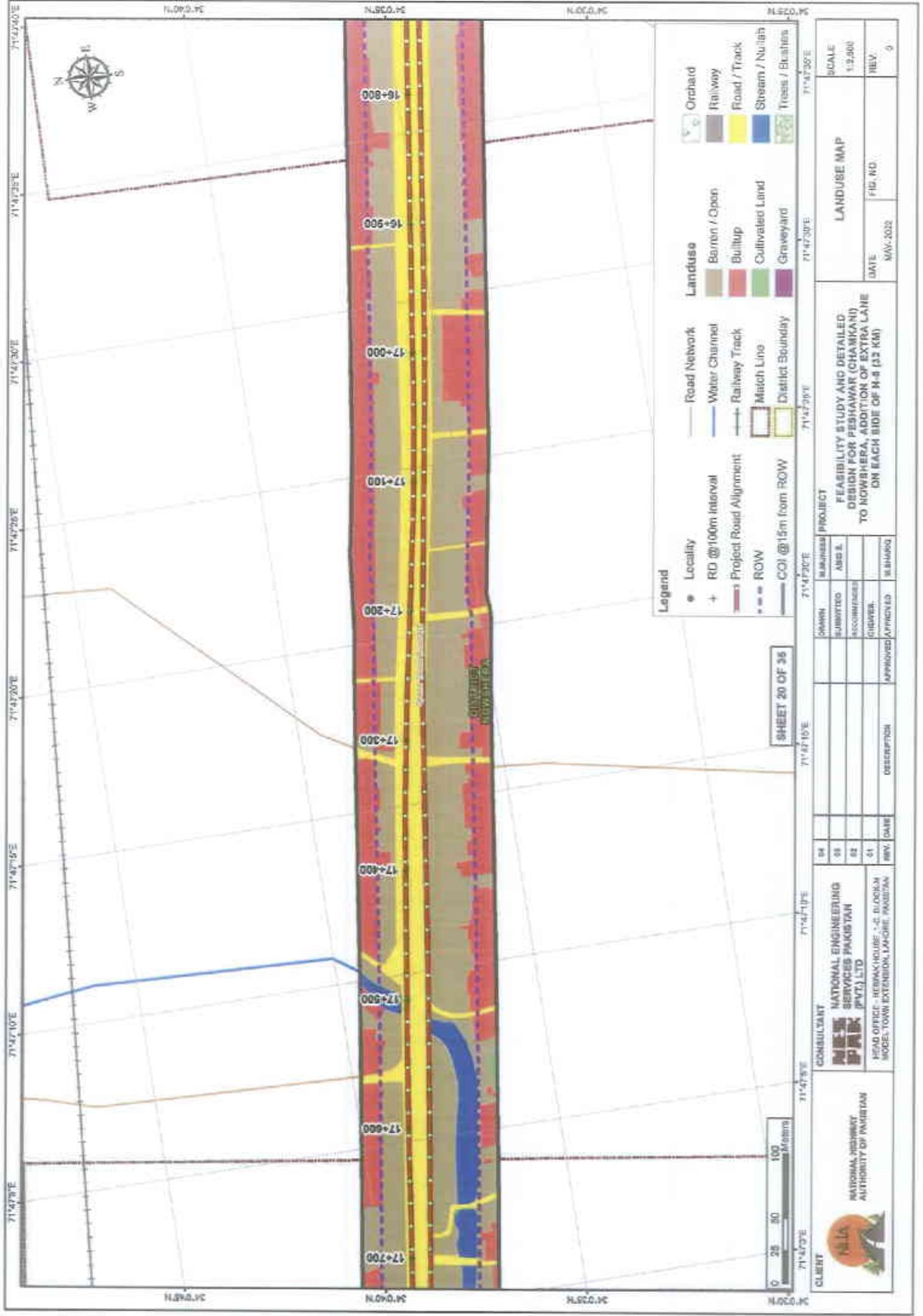
DESIGN	APPROVED	DATE
SUBMITTED		
RECOMMENDED		
CHIEFER		
MANAGING		

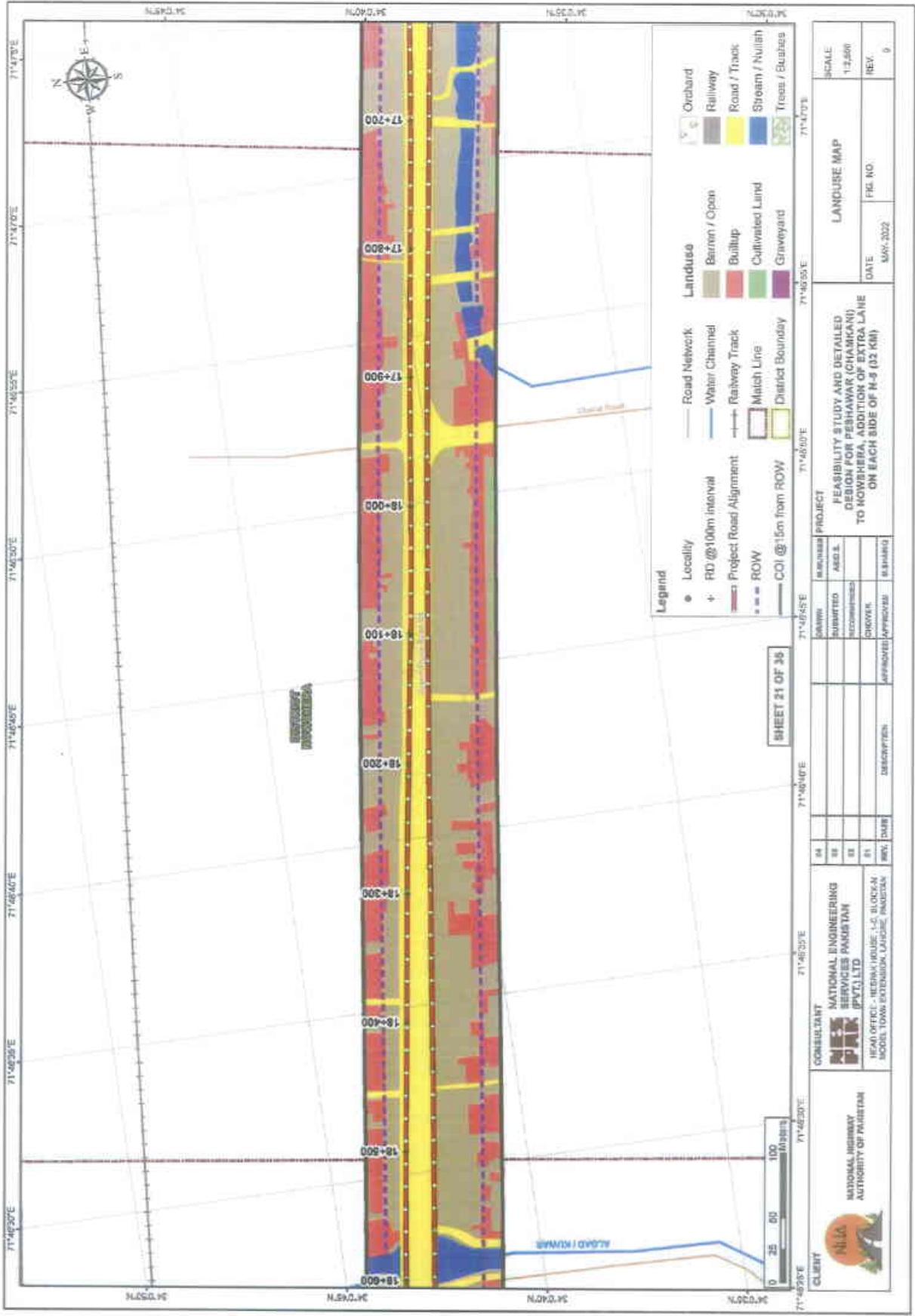
PROJECT

FEASIBILITY STUDY AND DETAILED
DESIGN FOR PESHAWAR (GHANKANI)
TO HOWANBERA, ADDITION OF EXTRA LANE
ON EACH SIDE OF M-8 (12 KM)

DATE	FIG. NO.	SCALE
MAY, 2022		1:1,000
REV.		REV.
0		0

LANDUSE MAP





DATE	MAY 2022	FIG. NO.	
SCALE	1:2500	REV.	0

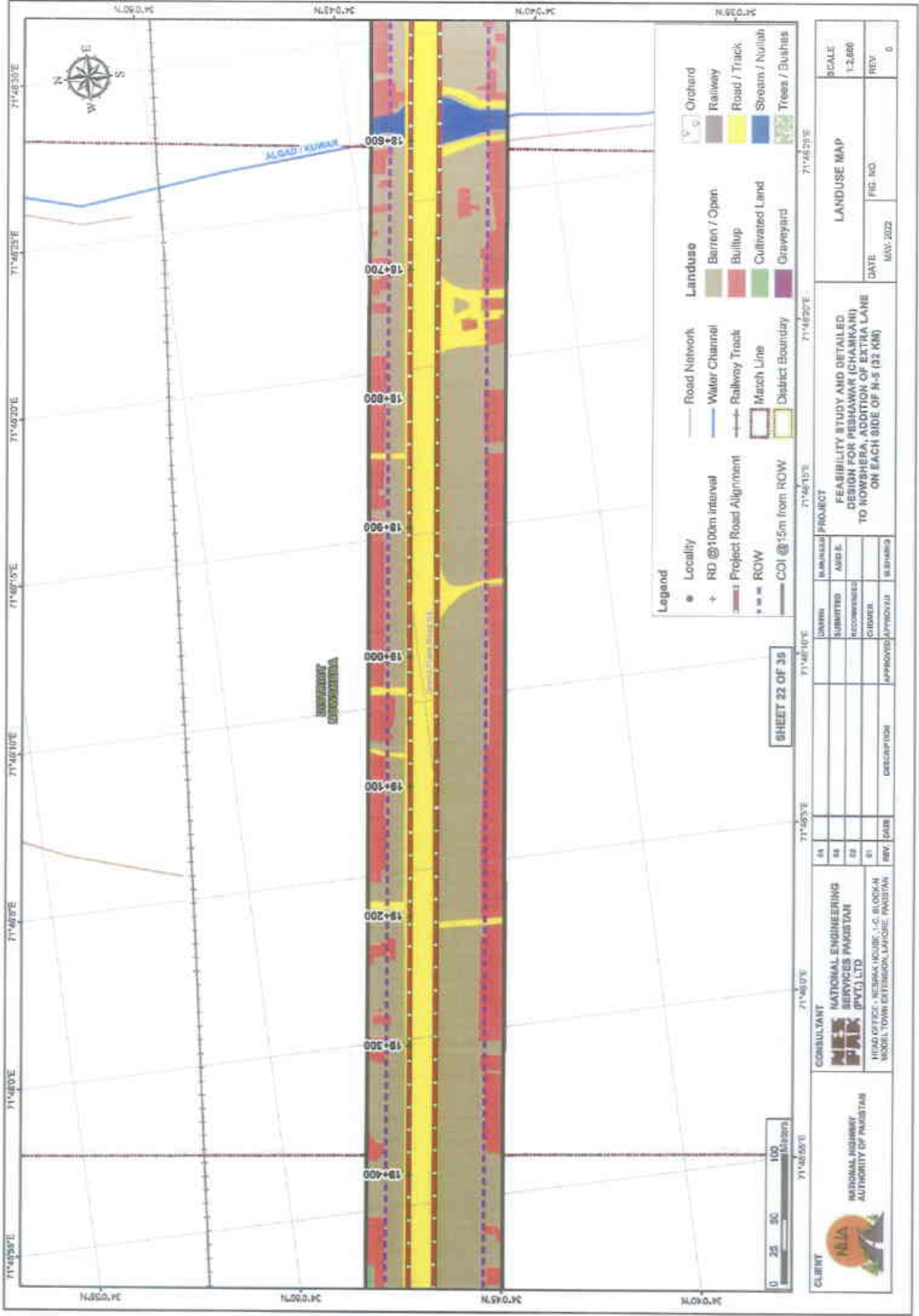
PROJECT
 FEASIBILITY STUDY AND DETAILED DESIGN FOR PESHAWAR (CHARKANI) TO NOWSHERA ADDITION OF EXTRA LAINE ON EACH SIDE OF N-5 (32 KM)

NO.	DATE	DESCRIPTION
01		APPROVED

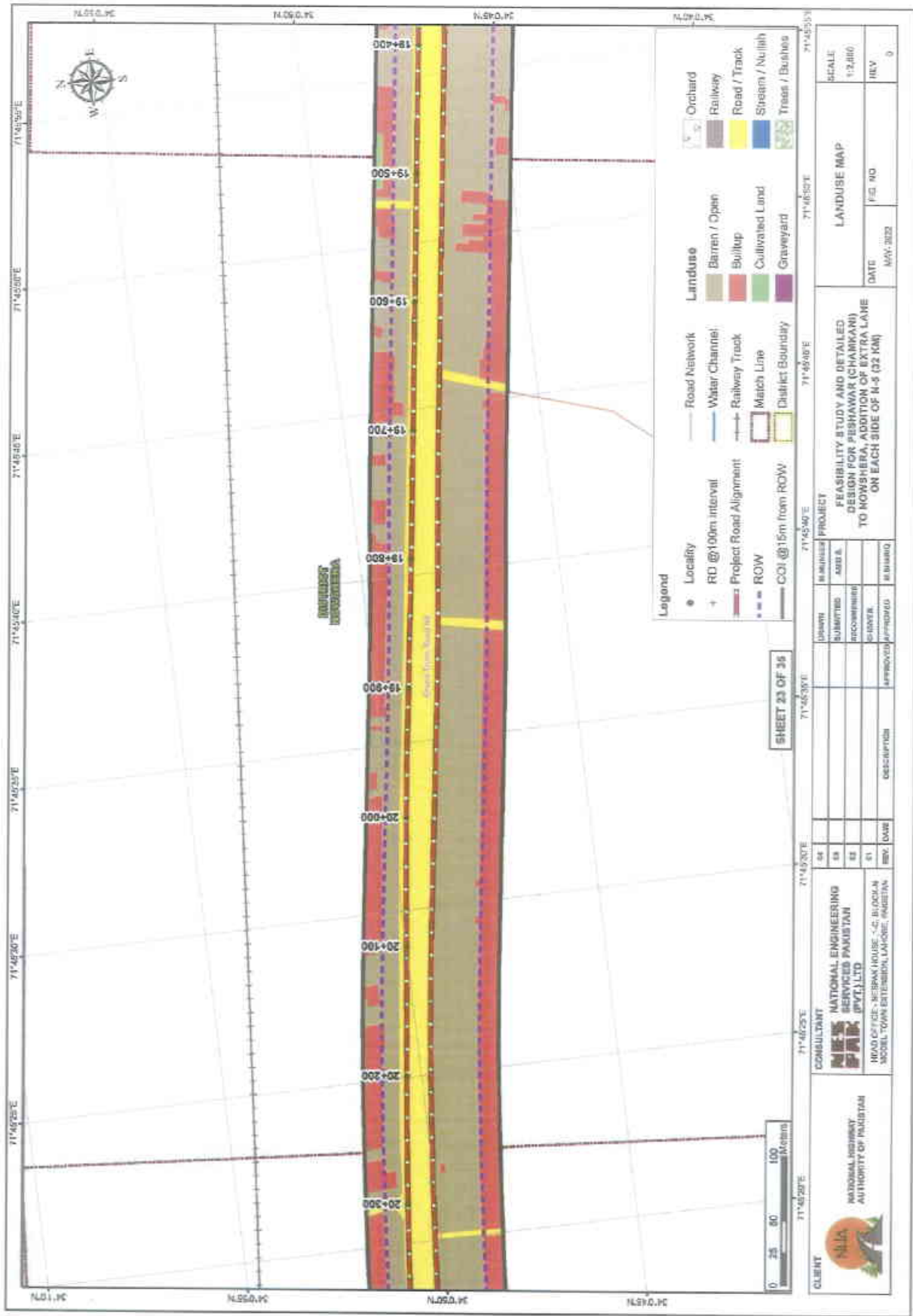
14		
15		
16		
17		

CONSULTANT
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD
 HEAD OFFICE - NEBAKHURSE L-6, BLOCK-A, MODEL TOWN EXTENSION, LAHORE, PAKISTAN

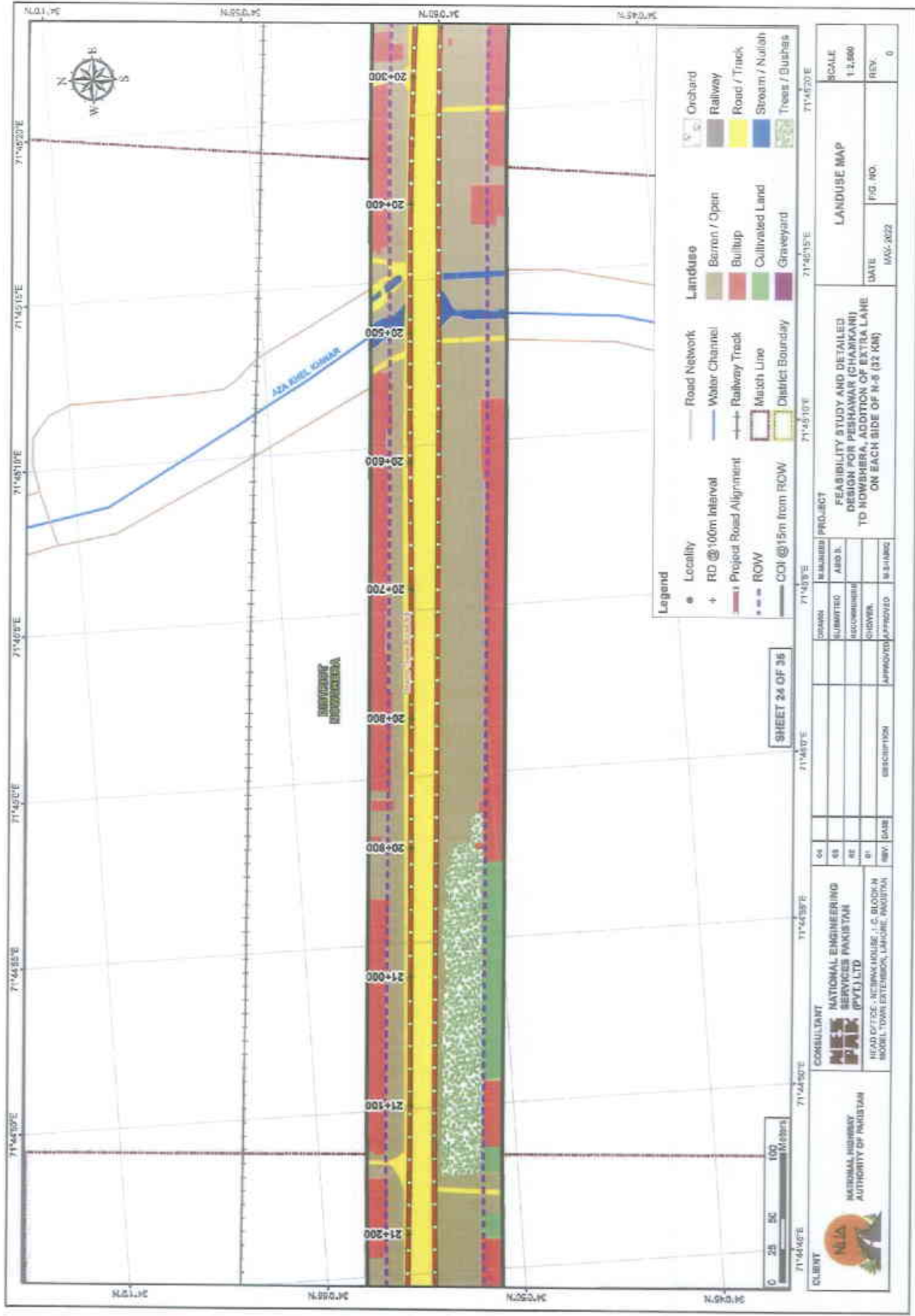
CLIENT
NATIONAL HIGHWAY AUTHORITY OF PAKISTAN

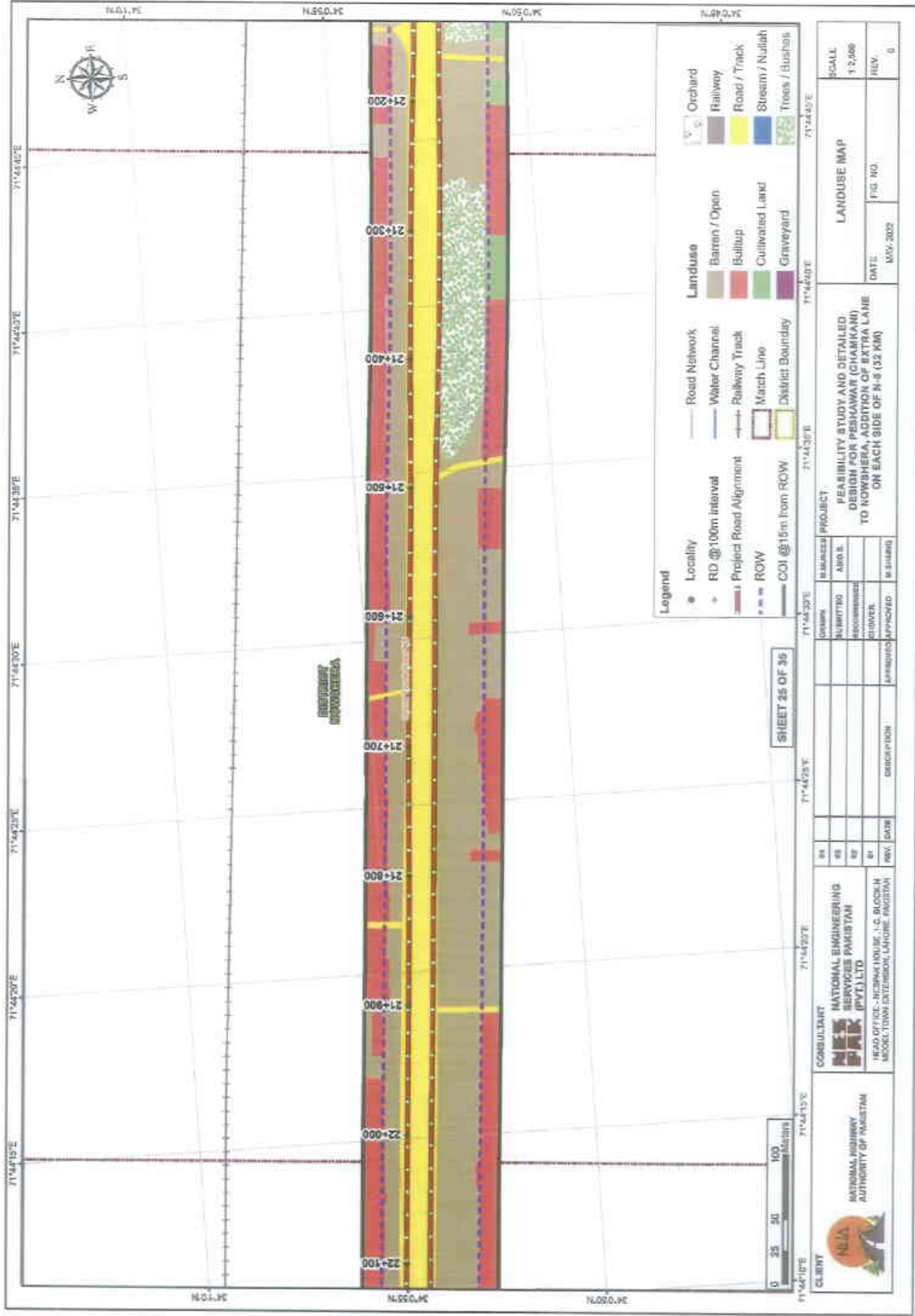


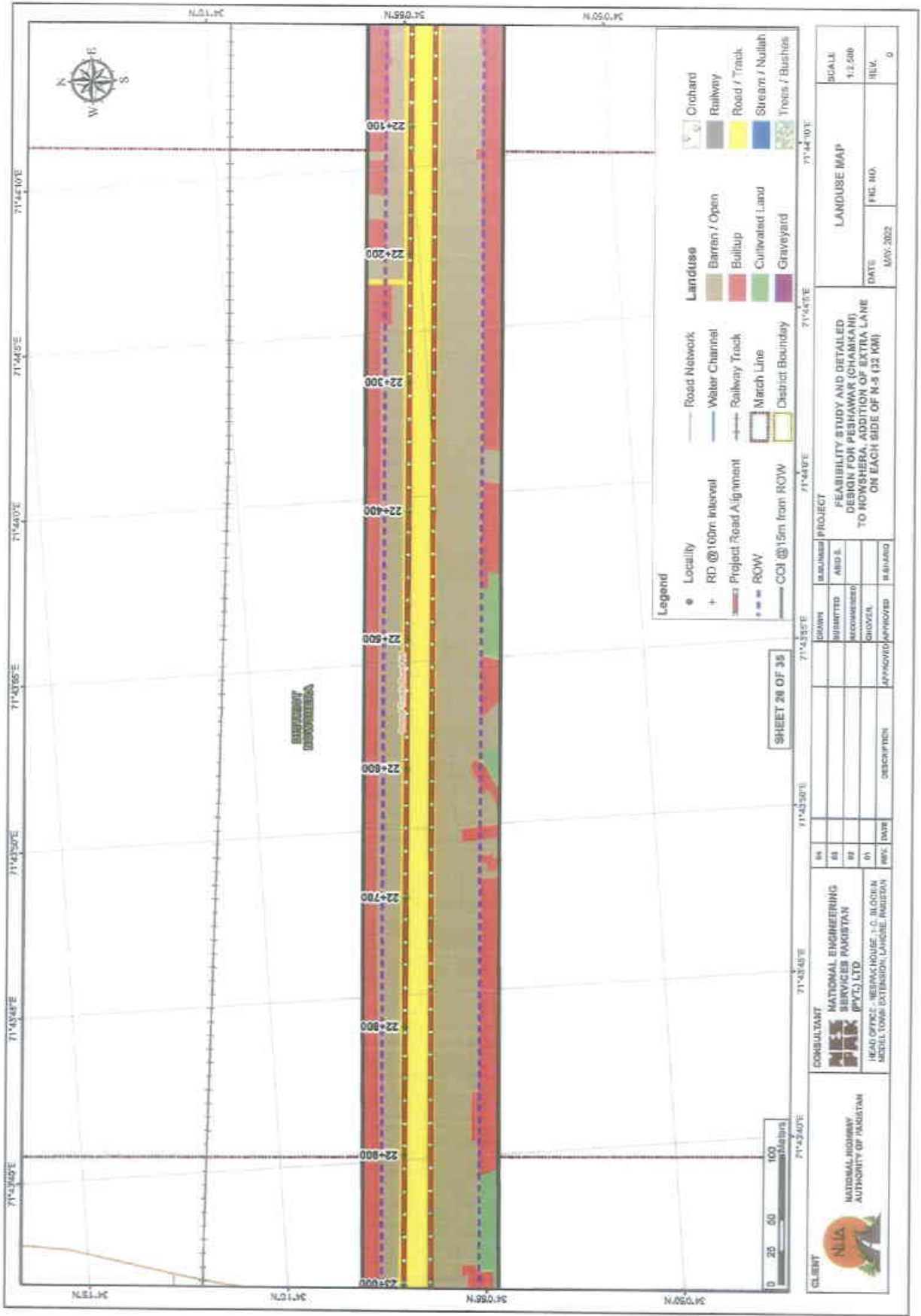
 NATIONAL HIGHWAY AUTHORITY OF PAKISTAN	CONSULTANT NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD HEAD OFFICE: HESPAK HOUSE, J.C. BLOCK 4 MODEL TOWN EXTENSION LAHORE, PAKISTAN		CLIENT NATIONAL HIGHWAY AUTHORITY OF PAKISTAN	
	SUBMITTED RECOMMENDED CORRECTED APPROVED	DRAWN CHECKED DESIGNED APPROVED	NO. 01 NO. 02 NO. 03 NO. 04	DATE DATE DATE DATE
PROJECT FEASIBILITY STUDY AND DETAILED DESIGN FOR PRESHAWAR (CHANKSARI) TO NOWSHERA, ADDITION OF EXTRA LANE ON EACH SIDE OF N-5 (32 KM)			LANDUSE MAP FIG. NO. 0 DATE: MAY, 2022	
SCALE 1:2,000			REV. 0	

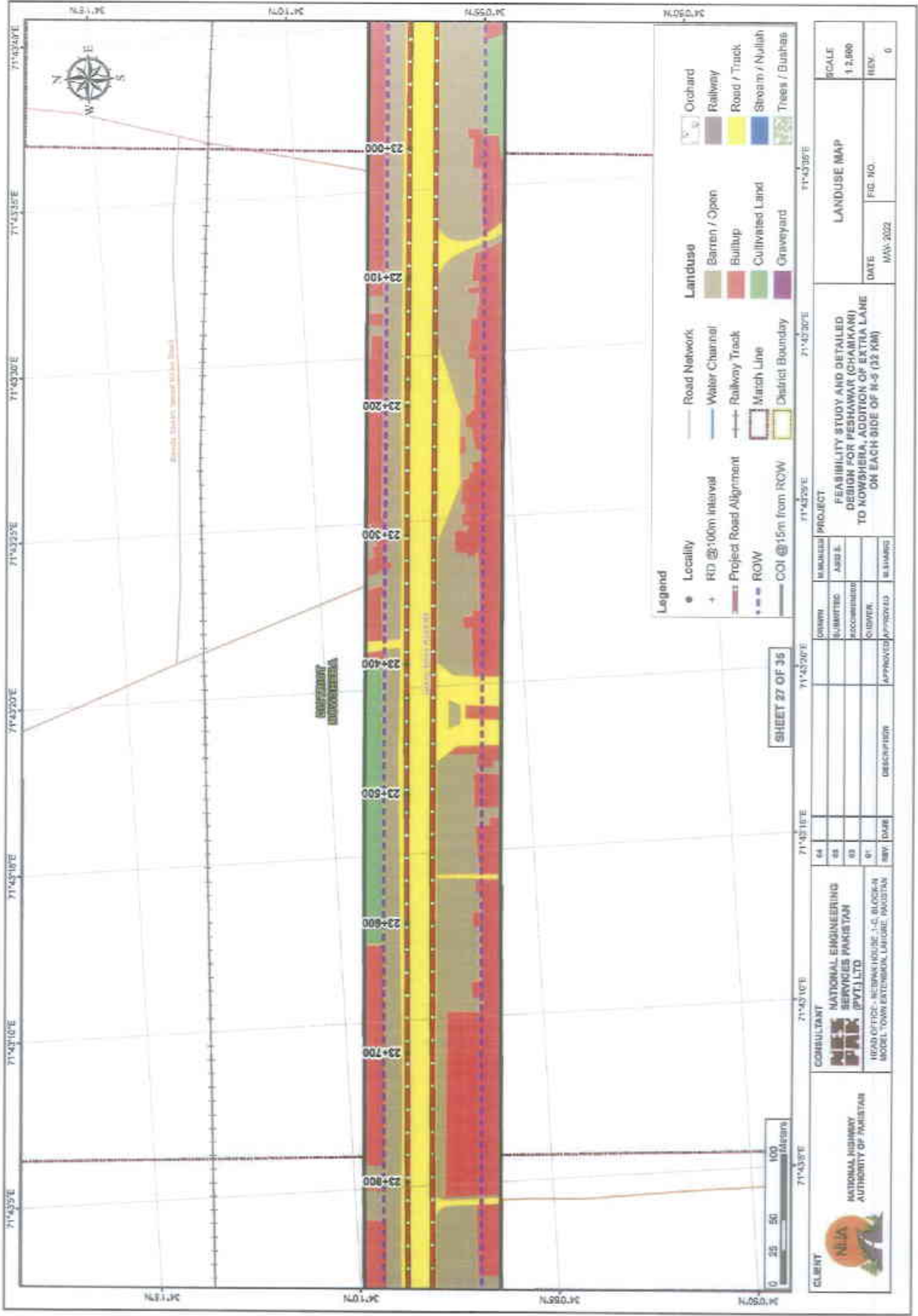


 NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD ROAD OFFICE, SEIBAK HOUSE -4-C, BUDAUN MODEL TOWN EXTENSION, LAHORE, PAKISTAN	CONSULTANT	04 08 02 01	REV. DATE	APPROVED / PREPARED	APPROVED / PREPARED	71°42'25"E 71°42'30"E 71°42'35"E 71°42'40"E 71°42'45"E 71°42'50"E 71°42'55"E	SHEET 23 OF 35	LOCALITY HOWSHERA	PROJECT FEASIBILITY STUDY AND DETAILED DESIGN FOR PESHAWAR (CHANKARI) TO HOWSHERA, ADDITION OF EXTRA LANE ON EACH SIDE OF N-5 (32 KM)	DATE MAY-2023	FIG. NO.	SCALE 1:2,400	REV. NO. 0
	CLIENT  NATIONAL HIGHWAY AUTHORITY OF PAKISTAN	DESCRIPTION	01	REV. DATE	APPROVED / PREPARED	APPROVED / PREPARED	71°42'25"E 71°42'30"E 71°42'35"E 71°42'40"E 71°42'45"E 71°42'50"E 71°42'55"E	SHEET 23 OF 35	LOCALITY HOWSHERA	PROJECT FEASIBILITY STUDY AND DETAILED DESIGN FOR PESHAWAR (CHANKARI) TO HOWSHERA, ADDITION OF EXTRA LANE ON EACH SIDE OF N-5 (32 KM)	DATE MAY-2023	FIG. NO.	SCALE 1:2,400









Legend

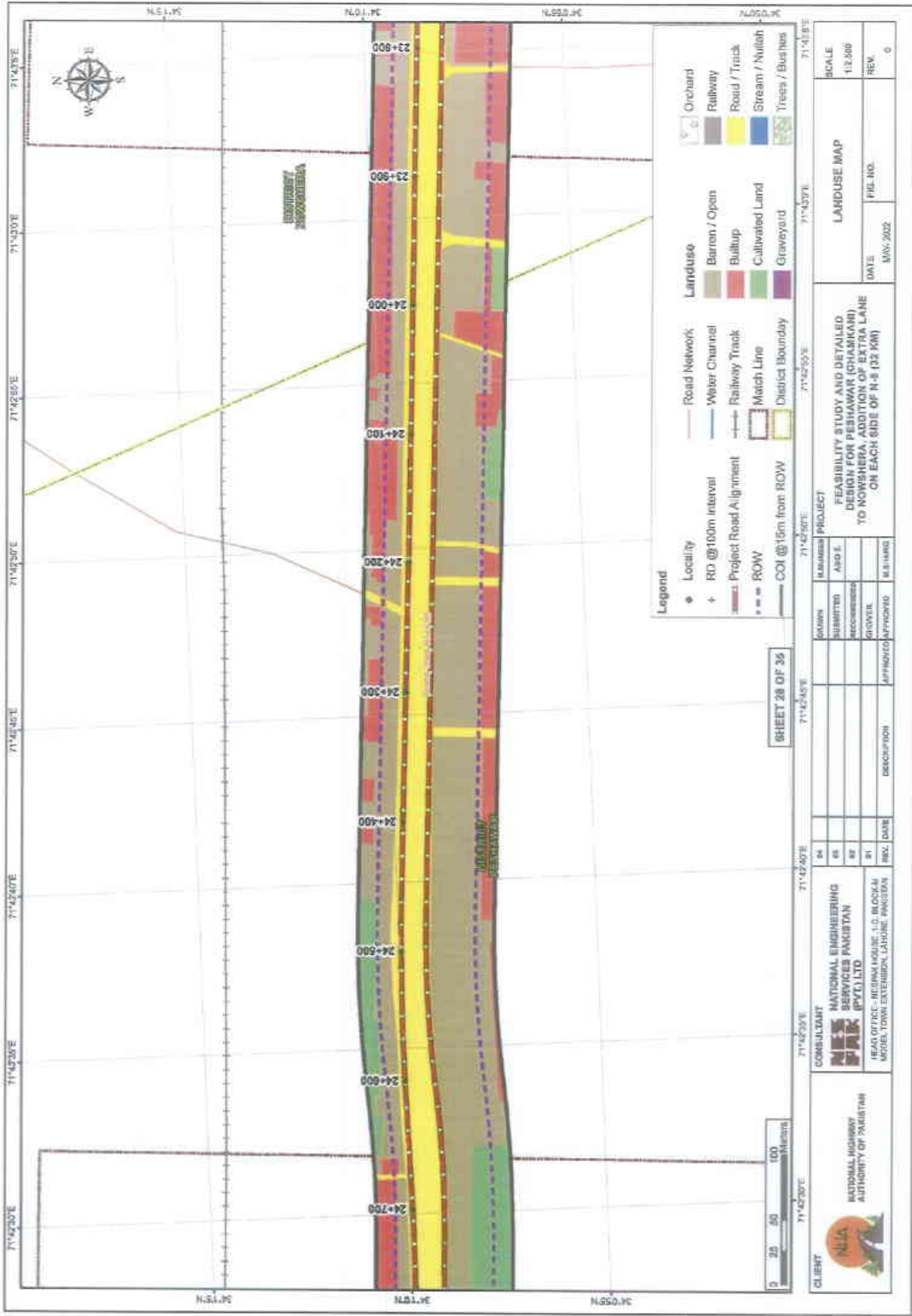
- Locality
- RD @ 100m Interval
- Project Road Alignment
- ROW
- COI @ 15m from ROW
- Road Network
- Water Channel
- Railway Track
- Match Line
- District Boundary
- Barren / Open
- Builtup
- Cultivated Land
- Orchard
- Railway
- Road / Track
- Stream / Nullah
- Trees / Bushes

<p>CLIENT NATIONAL HIGHWAY AUTHORITY OF PAKISTAN</p>	<p>CONSULTANT NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD HEAD OFFICE - HUDA KHALESI T.C. BLOCK-64 MODEL TOWN EXTENSION, LAHORE, PAKISTAN</p>	<p>64</p>	<p>65</p>	<p>66</p>	<p>67</p>	<p>68</p>	<p>69</p>	<p>70</p>	<p>71</p>	<p>72</p>	<p>73</p>	<p>74</p>	<p>75</p>	<p>76</p>	<p>77</p>	<p>78</p>	<p>79</p>	<p>80</p>
		<p>DATE</p>	<p>REVISION</p>	<p>DESCRIPTION</p>	<p>APPROVED BY</p>	<p>DATE</p>	<p>REVISION</p>	<p>DESCRIPTION</p>	<p>APPROVED BY</p>	<p>DATE</p>	<p>REVISION</p>	<p>DESCRIPTION</p>	<p>APPROVED BY</p>	<p>DATE</p>				

<p>SCALE 1:2,000</p>	<p>LAND USE MAP</p>
<p>DATE MAY-2022</p>	<p>FIG. NO. REV. 0</p>

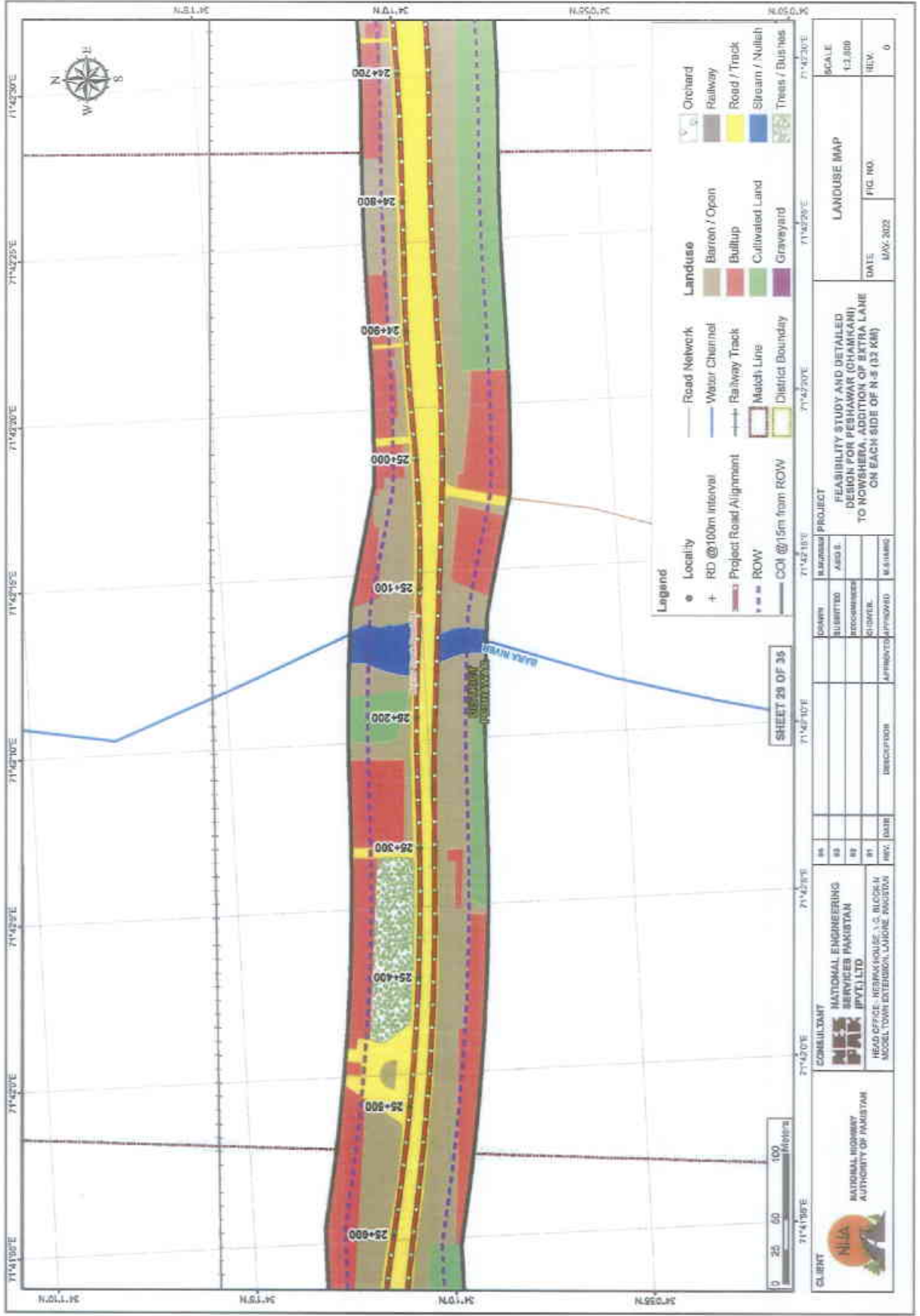
FEASIBILITY STUDY AND DETAILED DESIGN FOR PESHAWAR (CHANKARI) TO NOWSHERA ADDITION OF EXTRA LANE ON EACH SIDE OF N-5 (35 KM)

SHEET 27 OF 35

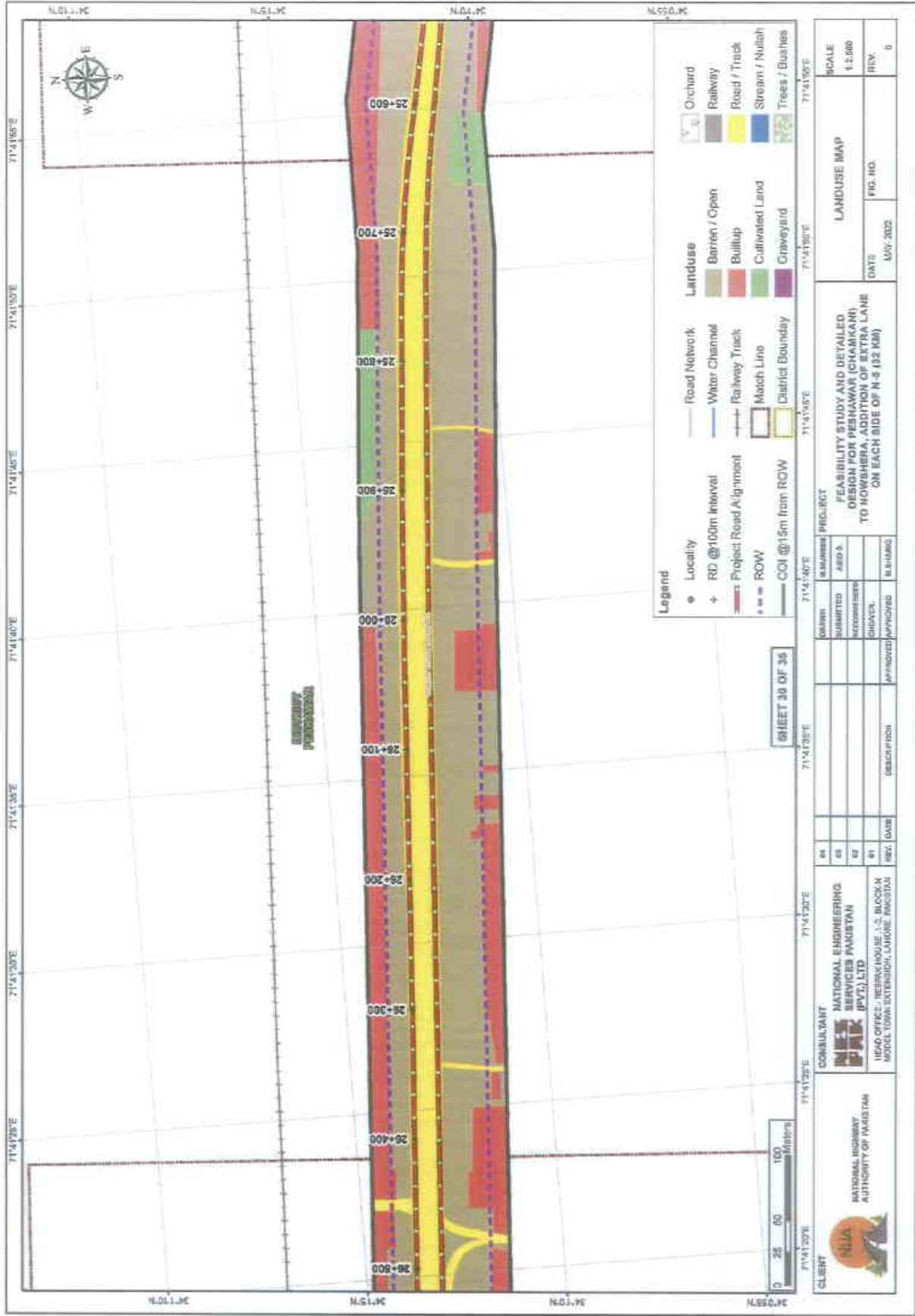


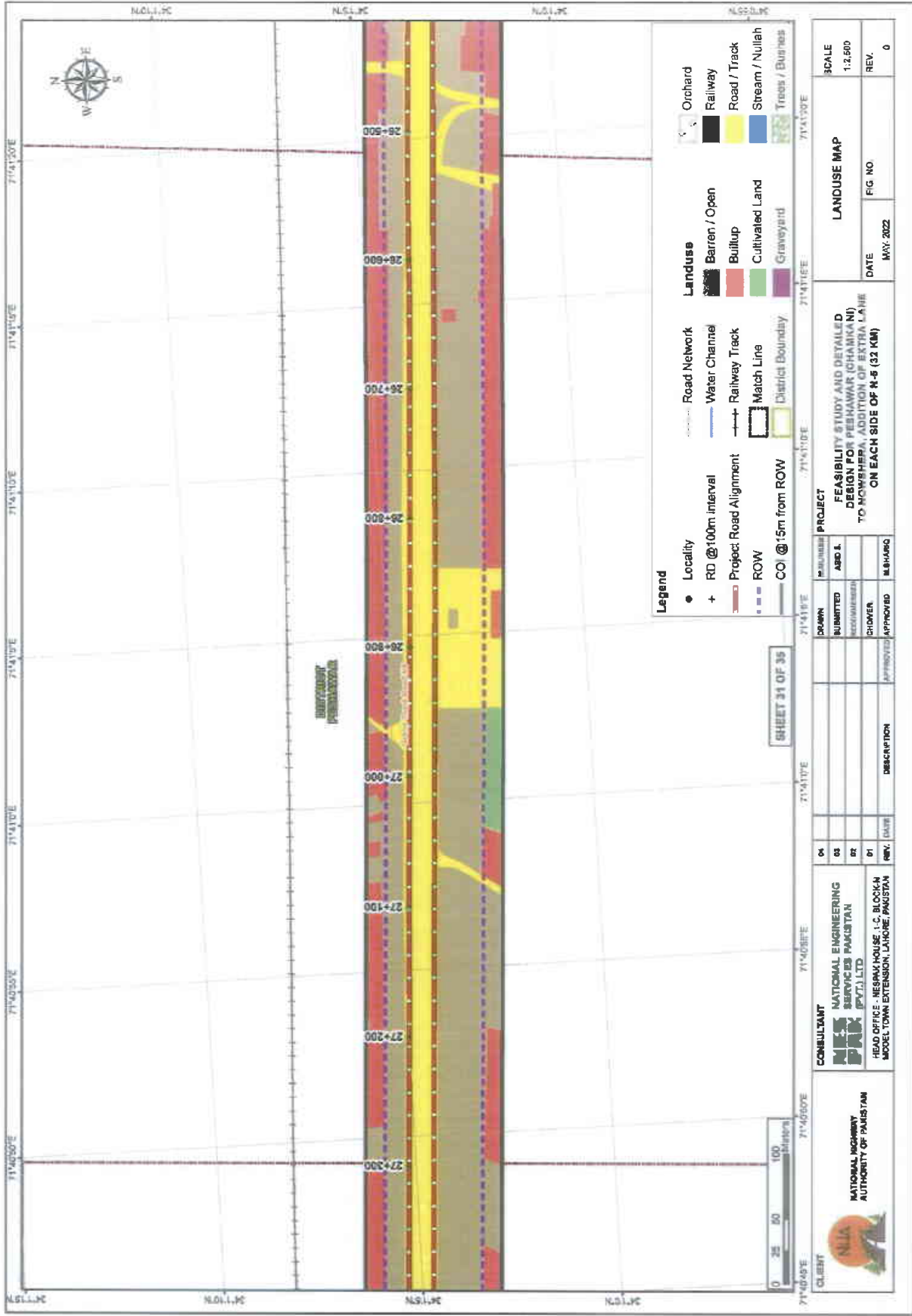
SHEET 28 OF 35

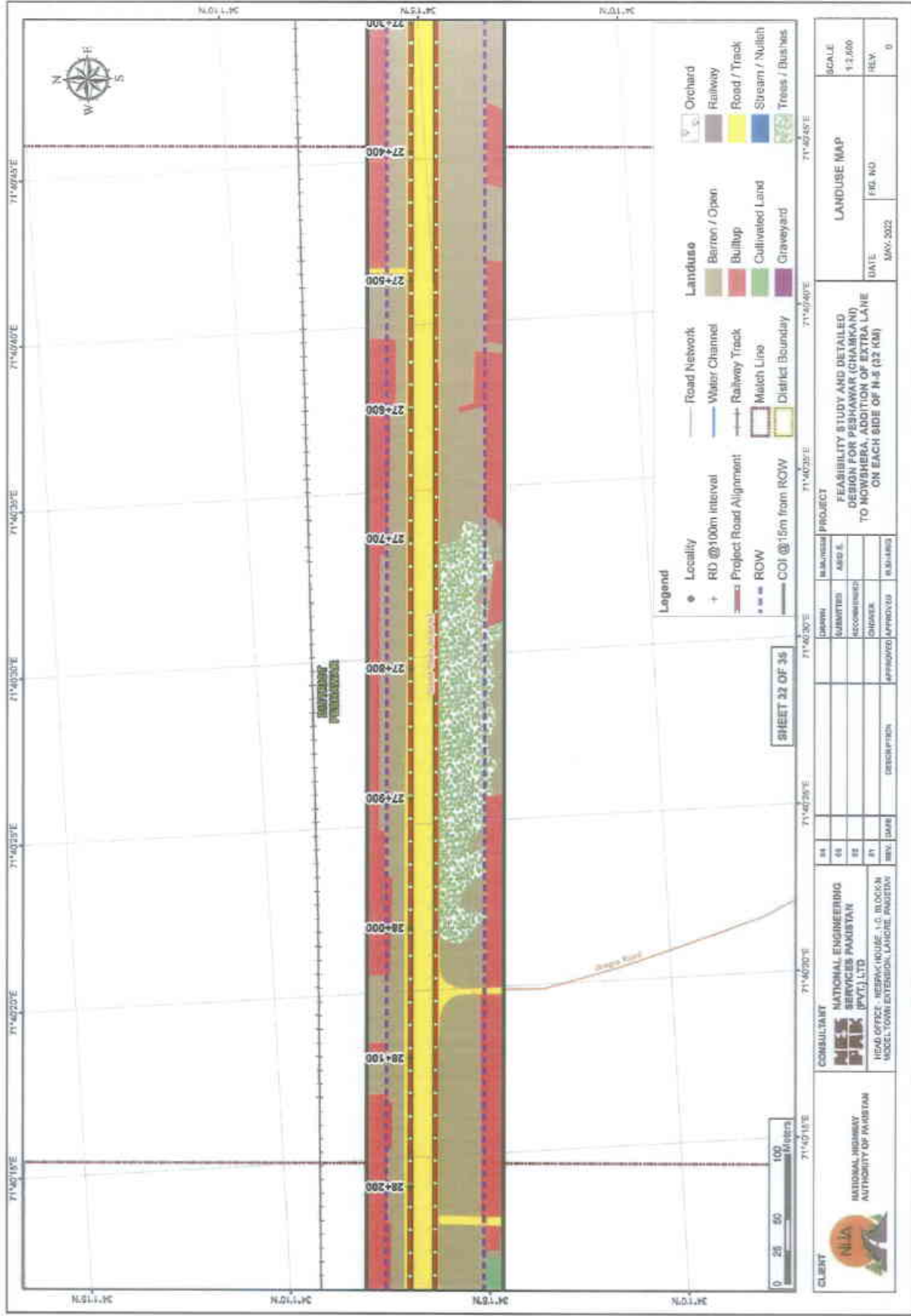
 NATIONAL HIGHWAY AUTHORITY OF PAKISTAN	CONSULTANT  NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD HEAD OFFICE - NEHRU ROAD, J.D. INDOUR MODEL TOWN EXTENSION, LAHORE, PAKISTAN		24 25 26 27	28 29 30 31	REV. DATE 24 25 26 27	DESIGNED BY CHECKED BY APPROVED BY M. S. HANIF	DATE 11/06/2022	FILE NO. 112/200	SCALE 1:2,500	REV. 0
	FEASIBILITY STUDY AND DETAILED DESIGN FOR PERHAWA (DHAMKARI) TO NOWSHERA ADDITION OF EXTRA LANE ON EACH SIDE OF N-8 (32 KM)		LANDUSE MAP		DATE 11/06/2022		FILE NO. 112/200		SCALE 1:2,500	

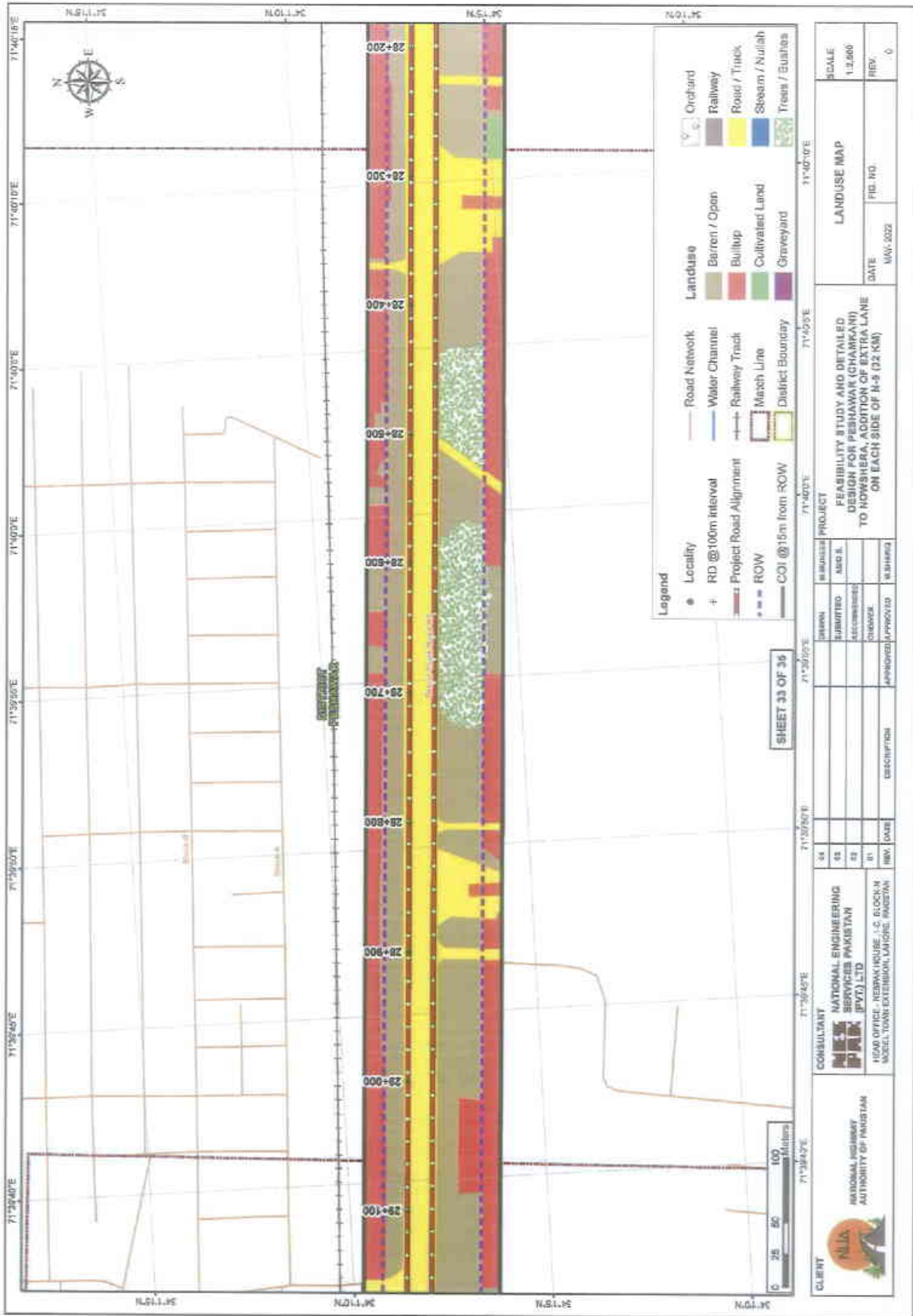


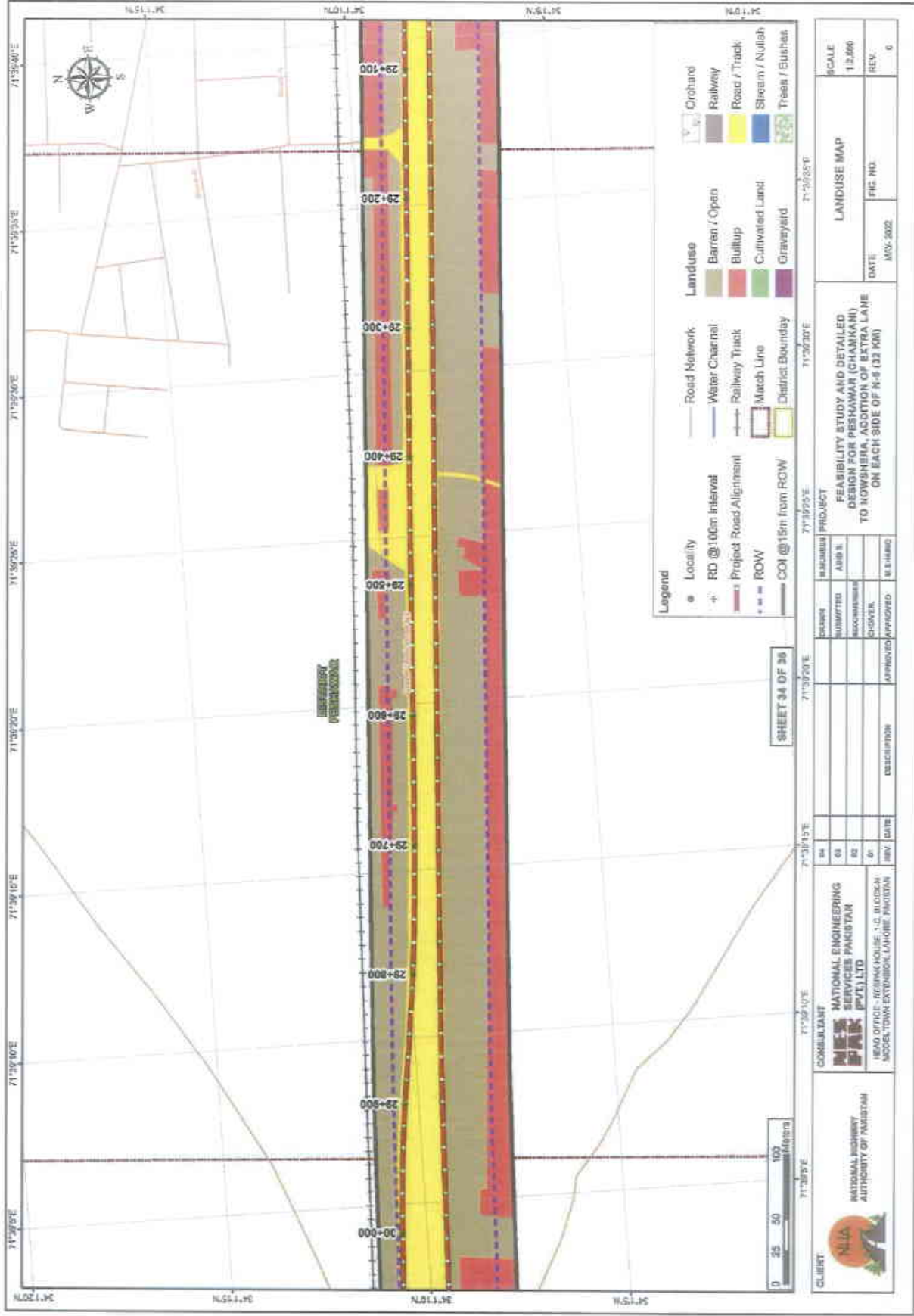
CLIENT  NATIONAL HIGHWAY AUTHORITY OF PAKISTAN	CONSULTANT  NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE: NERAKI HOUSE, S. BLOCK-II, MODEL TOWN EXTENSION, LAHORE, PAKISTAN	88 89 90 91 PKW/HAZP	NO. DESCRIPTION APPROVED APPROVED	DATE MAY-2022	FIG. NO.	LANDUSE MAP	
						SCALE 1:3,000	REV. 0
PROJECT: M. M. ROAD PROJECT DESIGN FOR PESHAWAR (CHAMKANI) TO NOWSHERA, ADDITION OF EXTRA LANE ON EACH SIDE OF N-3 (32 KM)			SUBMITTED: _____ RECOMMENDED: _____ CHECKED: _____ APPROVED: _____ M. S. HANAYI				



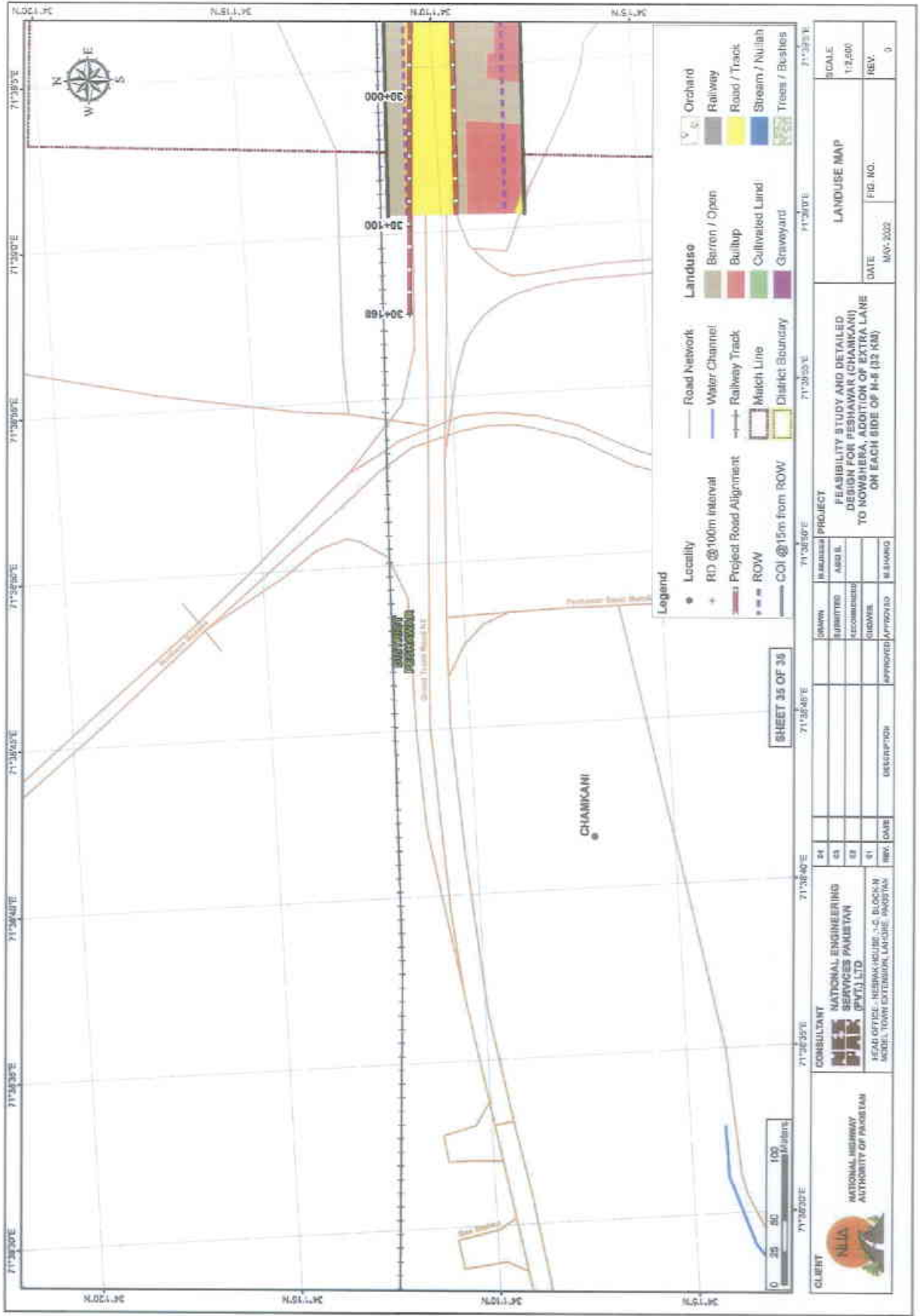






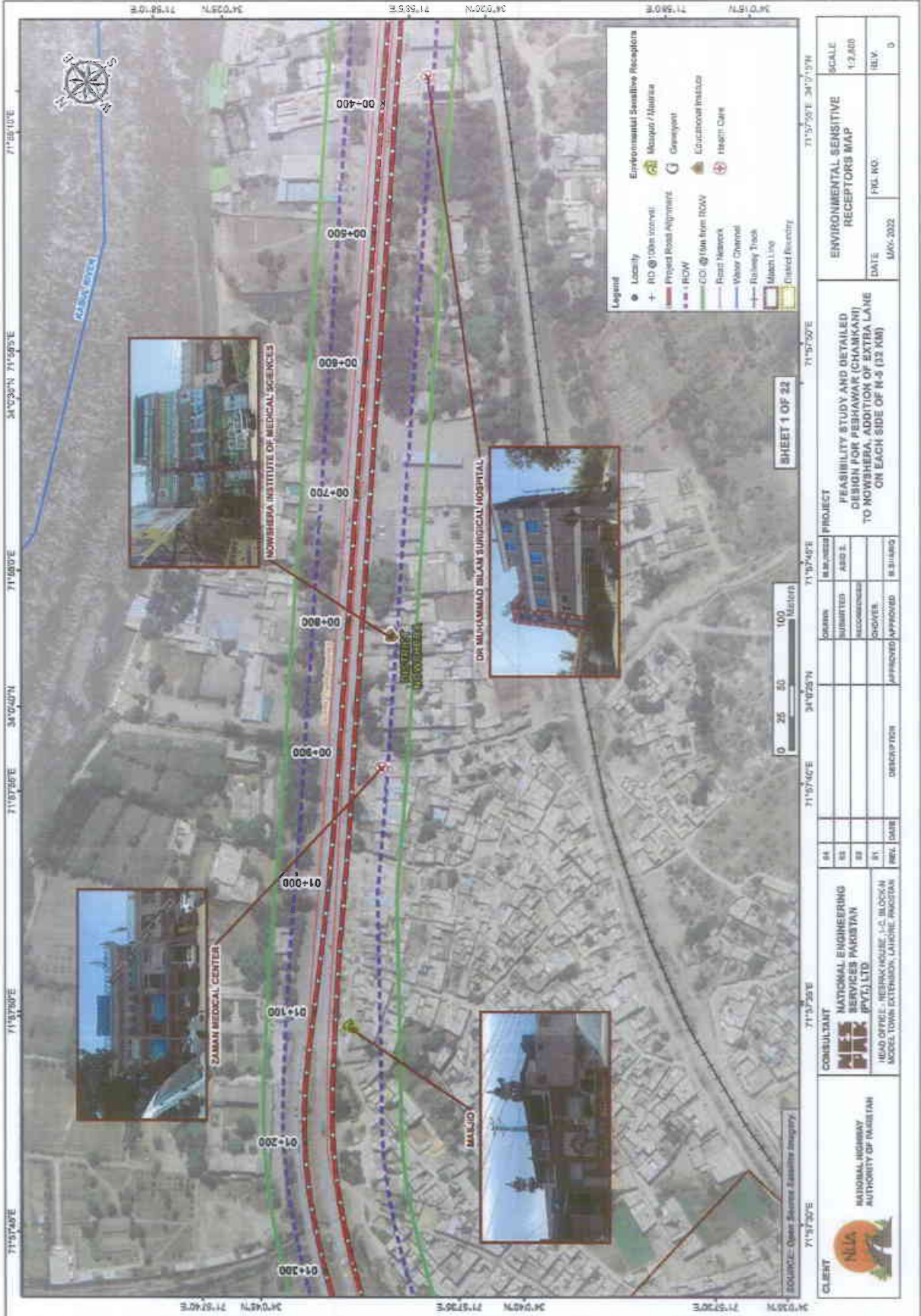


 NATIONAL HIGHWAY AUTHORITY OF PAKISTAN	CLIENT		NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD HEAD OFFICE - REGISTRATION HOUSE, 10, BLOCHAN MODEL TOWN EXTENSION LAHORE, PAKISTAN		CONSULTANT		PROJECT		LANDUSE MAP		SCALE 1:2,500
	APPROVED	APPROVED	APPROVED	APPROVED	APPROVED	APPROVED	APPROVED	APPROVED	DATE JULY 2022	FIG. NO.	REV.

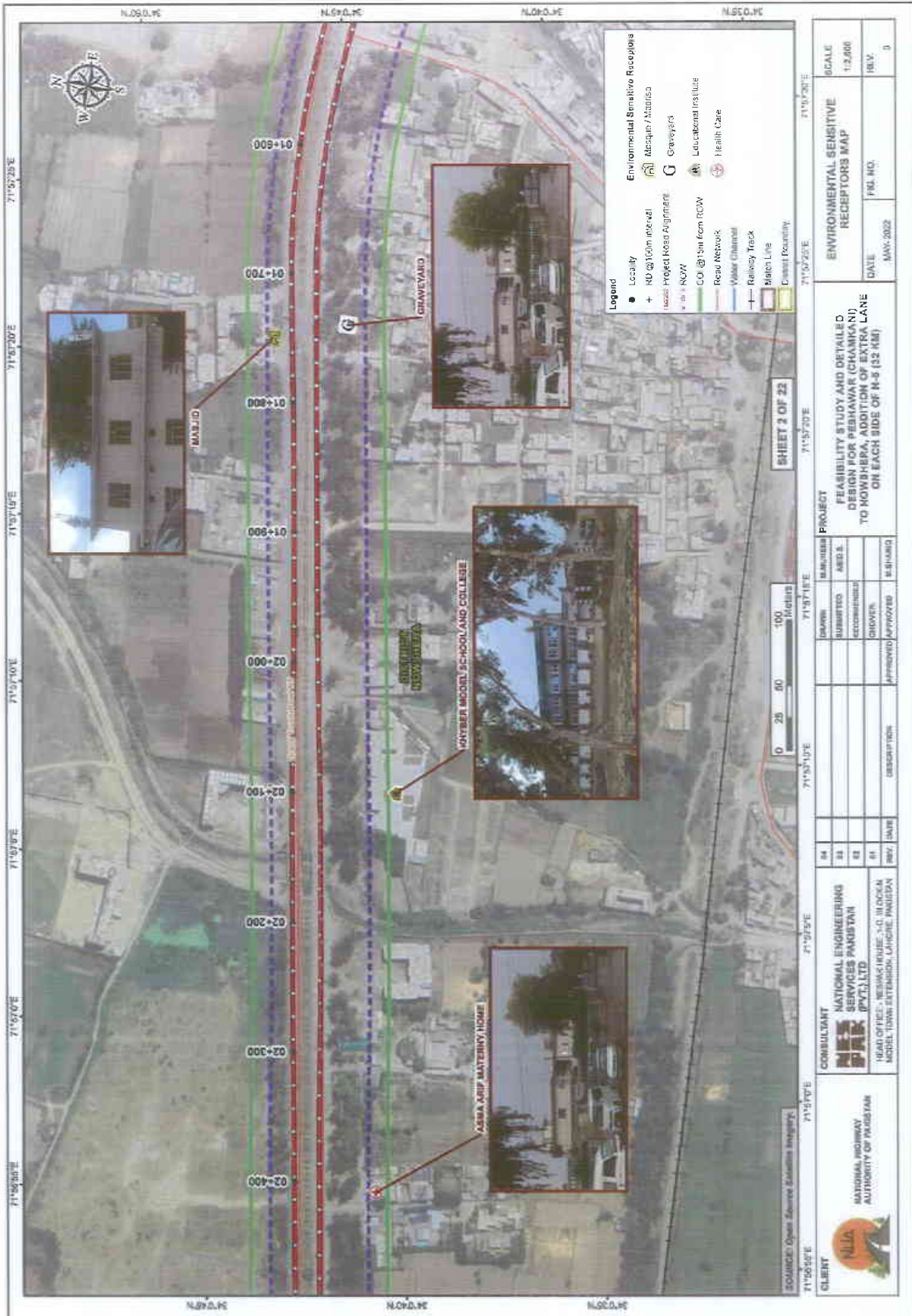


 NATIONAL HIGHWAY AUTHORITY OF PAKISTAN	CONSULTANT NESPAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD LEGAL OFFICE, NERWAN KHURD, C-6 BLOCK, W MODEL TOWN, EXTENSION, LAHORE, PAKISTAN		DRAWN SUBMITTED RECOMMENDED APPROVED	24 03 02 01	71°35'00" E 71°35'40" E 71°36'20" E 71°37'00" E	34°15'00" N 34°15'40" N 34°16'20" N 34°17'00" N
	CLIENT NATIONAL HIGHWAY AUTHORITY OF PAKISTAN		PROJECT FEASIBILITY STUDY AND DETAILED DESIGN FOR PESHAWAR (CHAMKANI) TO MOWATERA, ADDITION OF EXTRA LANE ON EACH SIDE OF N-4 (32 KM)		SHEET 35 OF 36	
LANDUSE MAP			DATE MAY-2022		FIG. NO. 0	
SCALE 1:2500			REV. 0		0	

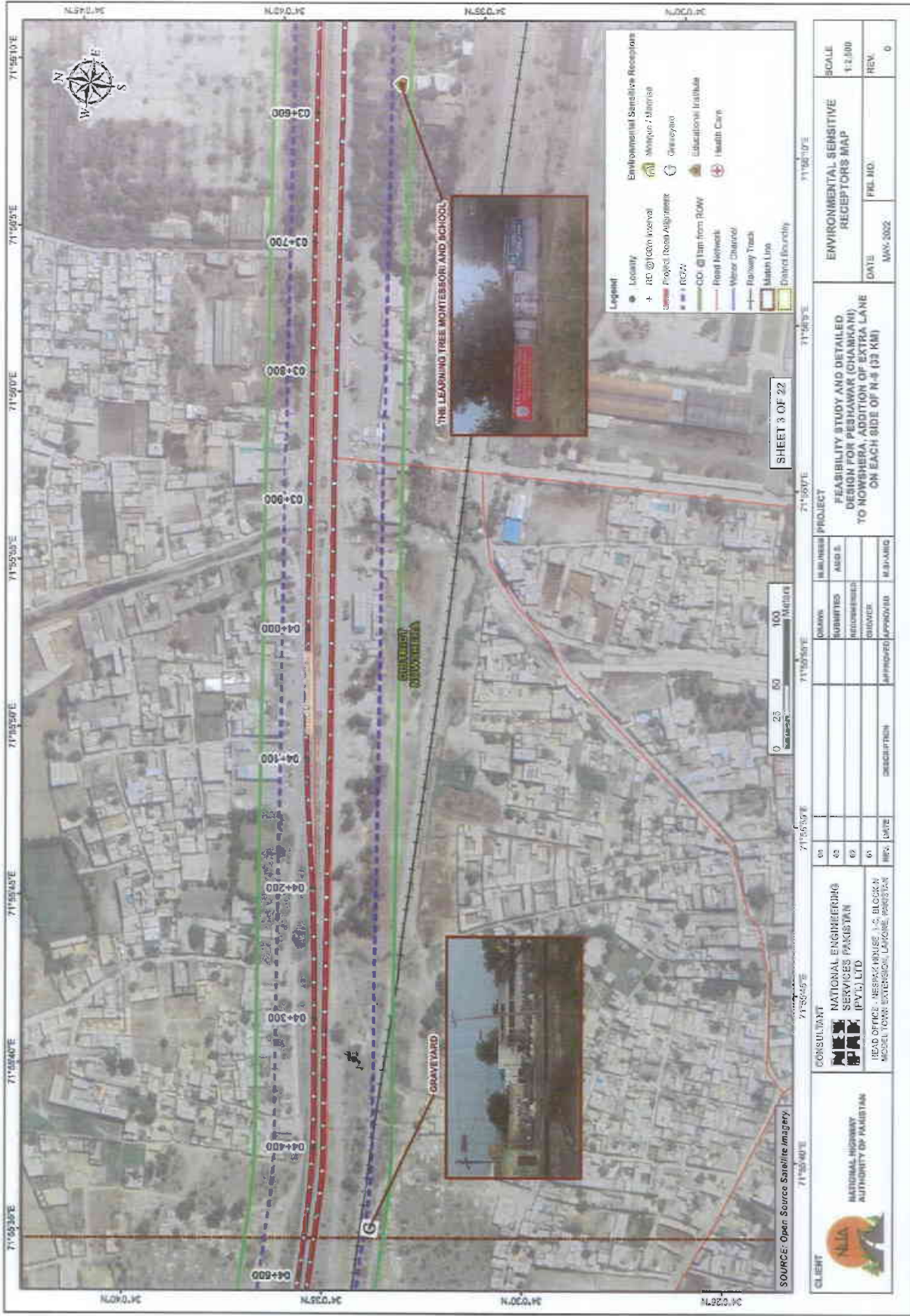
**ANNEX-III: SENSITIVE RECEPTOR
STRETCH WISE MAPS**



CLIENT  NATIONAL HIGHWAY AUTHORITY OF PAKISTAN		CONSULTANT  NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD HEAD OFFICE - REFRANKHOSE, I-C BLOCK N MODEL TOWN EXTENSION, LAHORE, PAKISTAN		<table border="1"> <tr> <th>REV.</th> <th>DATE</th> <th>DESCRIPTION</th> <th>APPROVED</th> </tr> <tr> <td>01</td> <td></td> <td></td> <td></td> </tr> <tr> <td>02</td> <td></td> <td></td> <td></td> </tr> <tr> <td>03</td> <td></td> <td></td> <td></td> </tr> <tr> <td>04</td> <td></td> <td></td> <td></td> </tr> </table>		REV.	DATE	DESCRIPTION	APPROVED	01				02				03				04				<table border="1"> <tr> <th>JOB NO.</th> <th>DATE</th> <th>APPROVED</th> </tr> <tr> <td></td> <td></td> <td></td> </tr> </table>		JOB NO.	DATE	APPROVED				<table border="1"> <tr> <th>NO.</th> <th>DATE</th> <th>APPROVED</th> </tr> <tr> <td></td> <td></td> <td></td> </tr> </table>		NO.	DATE	APPROVED				<table border="1"> <tr> <th>NO.</th> <th>DATE</th> <th>APPROVED</th> </tr> <tr> <td></td> <td></td> <td></td> </tr> </table>		NO.	DATE	APPROVED				<table border="1"> <tr> <th>NO.</th> <th>DATE</th> <th>APPROVED</th> </tr> <tr> <td></td> <td></td> <td></td> </tr> </table>		NO.	DATE	APPROVED			
REV.	DATE	DESCRIPTION	APPROVED																																																						
01																																																									
02																																																									
03																																																									
04																																																									
JOB NO.	DATE	APPROVED																																																							
NO.	DATE	APPROVED																																																							
NO.	DATE	APPROVED																																																							
NO.	DATE	APPROVED																																																							
SOURCE: Open Source Satellite Imagery.				SHEET 1 OF 22																																																					
PROJECT FEASIBILITY STUDY AND DETAILED DESIGN FOR PESHAWAR (CHAMKANI) TO NOWSHERA, ADDITION OF EXTRA LANE ON EACH SIDE OF N-5 (13 KM)				ENVIRONMENTAL SENSITIVE RECEPTORS MAP																																																					
DATE MAY-2022				SCALE 1:2,400																																																					
PTL NO.				RELV.																																																					



 NATIONAL HIGHWAY AUTHORITY OF PAKISTAN	CLIENT	CONSULTANT NES NATIONAL ENGINEERING SERVICES PAKISTAN PVT. LTD. HEAD OFFICE - BETAHUS HOUSE, 3-D, BLOCK M, MODEL TOWN EXTENSION, LAHORE, PAKISTAN	PREP. DATE 01	DESCRIPTION APPROVED	APPROVED BY M. HANIF	SUBMITTED 03	REVISIONS 02	DRAWN 04	CHECKED 03	APPROVED 02	PROJECT FEASIBILITY STUDY AND DETAILED DESIGN FOR PEBHAWAR (CHAMKAN) TO MOWBHERA, ADDITION OF EXTRA LANE ON EACH SIDE OF N-3 (32 KM)	ENVIRONMENTAL SENSITIVE RECEPTORS MAP	SCALE 1:2,500
												DATE MAY-2022	FIG. NO.

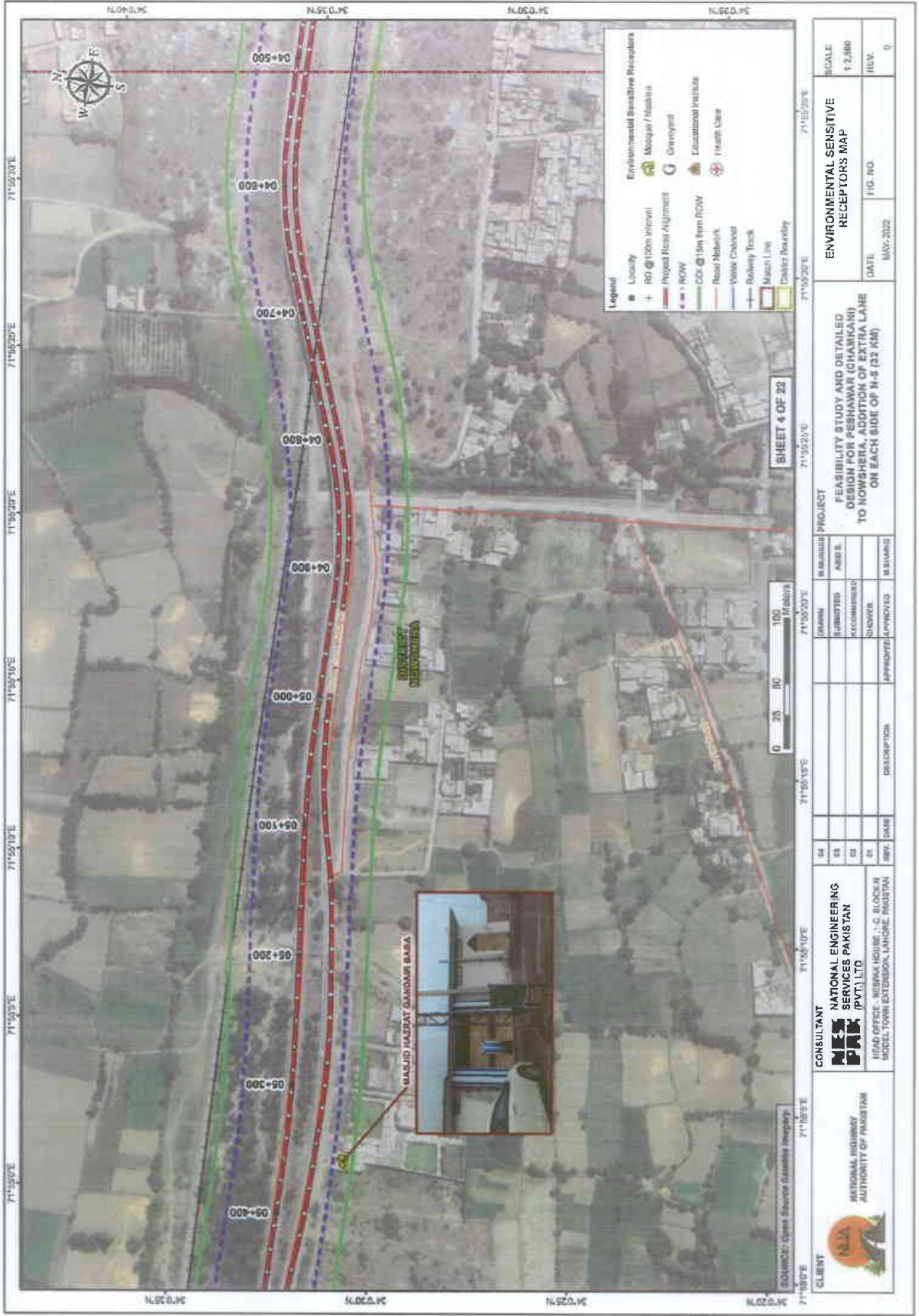


SHEET 3 OF 22

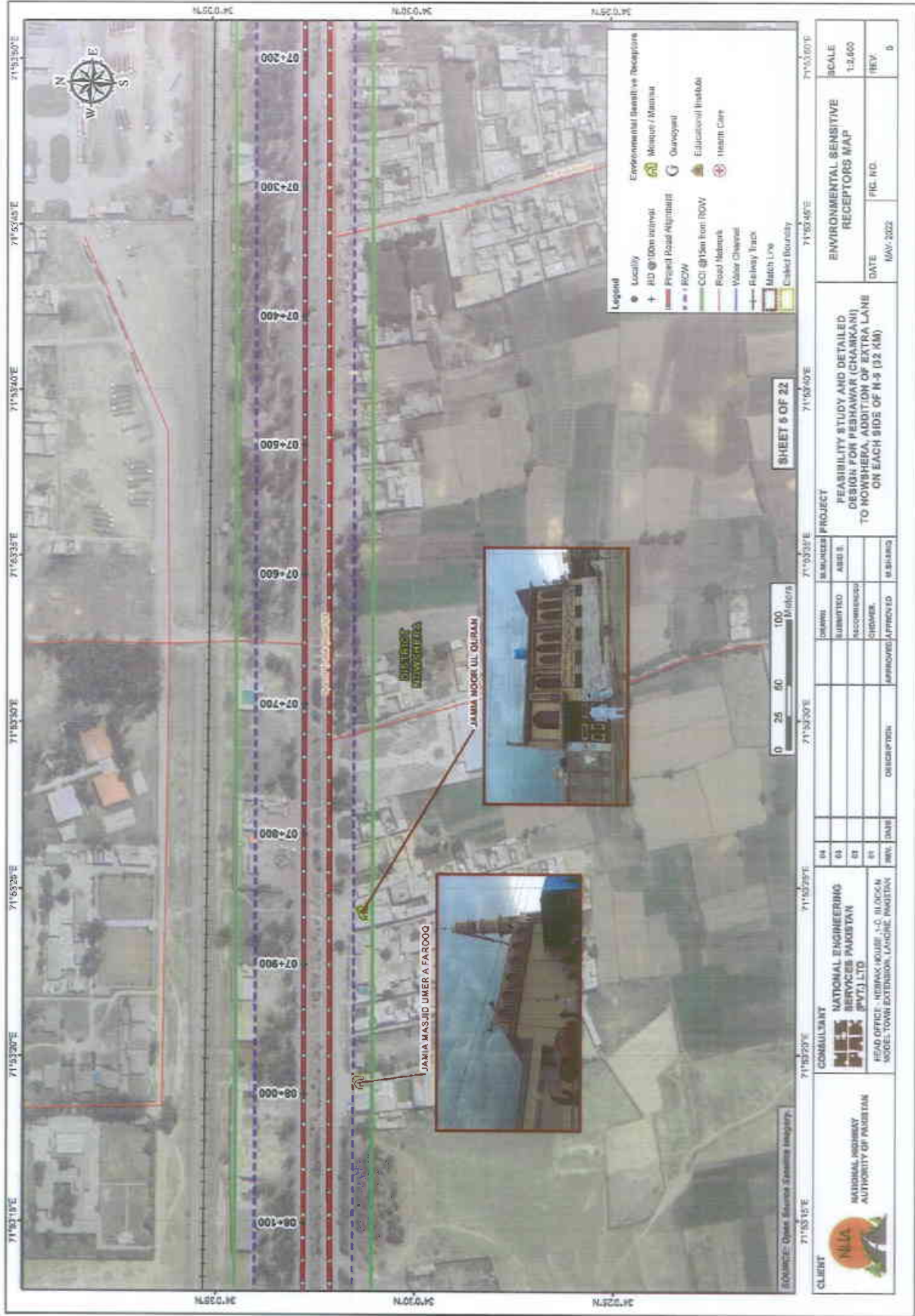
SOURCE: Open Source Satellite Imagery

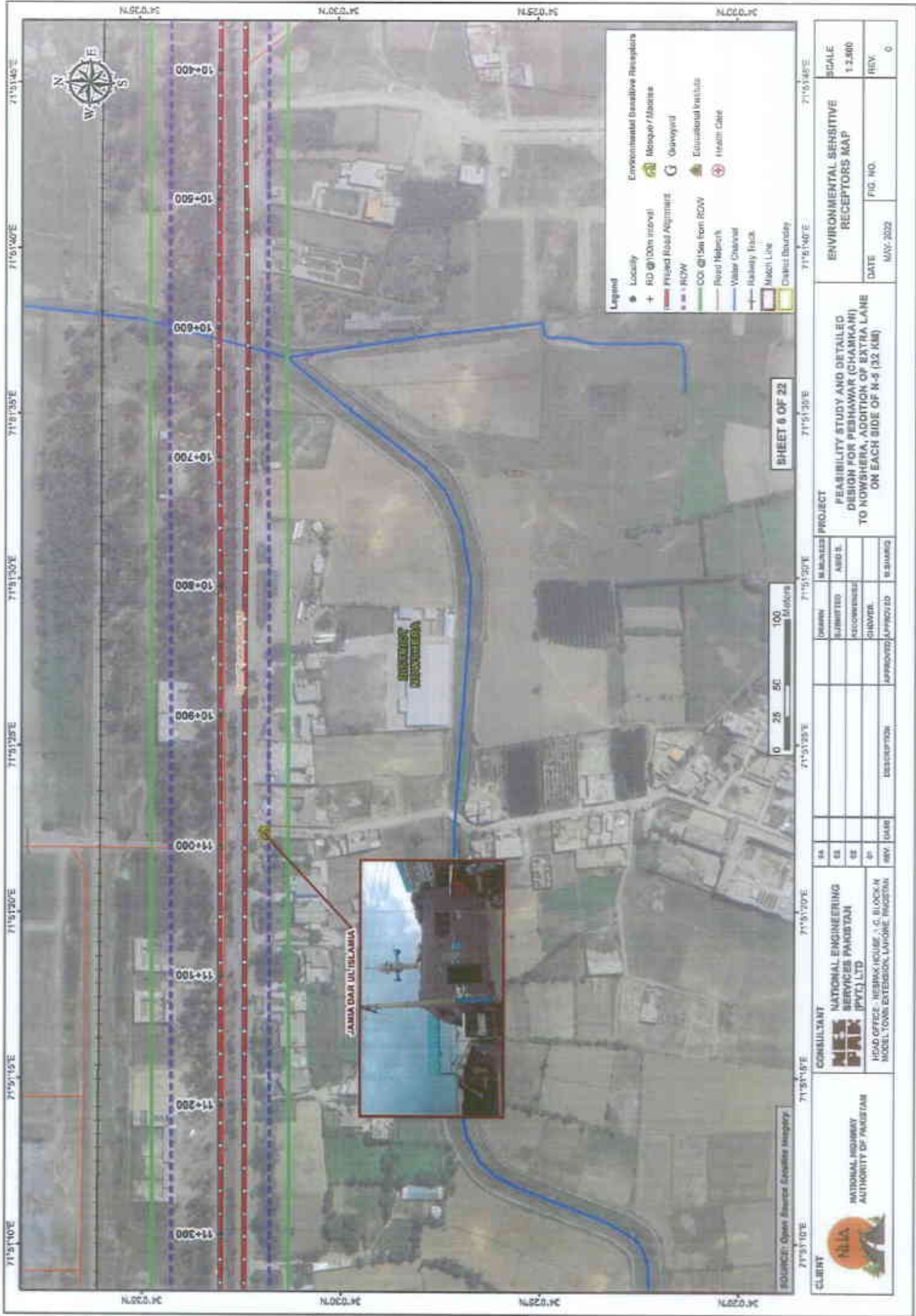
NO.	DATE	DESCRIPTION	APPROVED	REVISION
01				
02				
03				
04				
05				

CLIENT	NATIONAL HIGHWAY AUTHORITY OF PAKISTAN
CONSULTANT	NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD. HEAD OFFICE: NESPAK HOUSE, J.C. BLOCK N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN
PROJECT	FEASIBILITY STUDY AND DETAILED DESIGN FOR PESHAWAR (CHAKKANI) TO NOWSHERA, ADDITION OF EXTRA LANE ON EACH SIDE OF N-8 (32 KM)
SCALE	1:2,000
DATE	MAY-2022
FILE NO.	
REV.	0

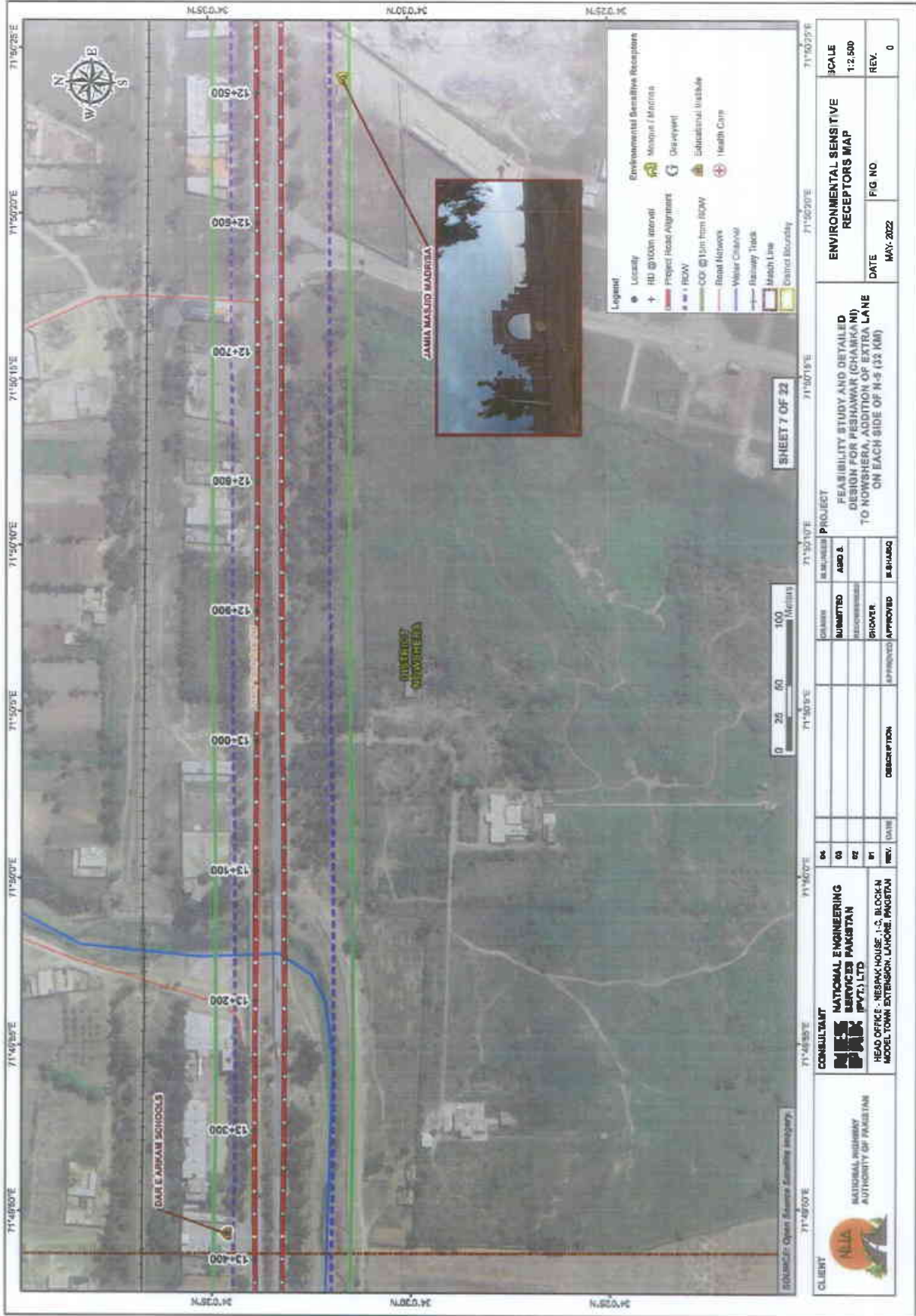


 NATIONAL HIGHWAY AUTHORITY OF PAKISTAN	CLIENT	CONSULTANT NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD HEAD OFFICE: WEBBIS HOUSE - C, BLOCK H MODEL TOWN EXTENSION LAHORE, PAKISTAN		PROJECT FEASIBILITY STUDY AND DETAILED DESIGN FOR PESHAWAR (GHAKHAKHI) TO NOWSHERA, ADDITION OF EXTRA LANE ON EACH SIDE OF N-5 (32 KM)		ENVIRONMENTAL SENSITIVE RECEPTORS MAP	
		SOURCE: Open Street Maps Imagery	SHEET 4 OF 22	DATE: MAY-2022	FIG. NO.	SCALE: 1:2,400	REV.





<p>NATIONAL INQUIRY AUTHORITY OF PUNJAB</p>	<p>CLIENT</p>	<p>CONSULTANT</p> <p>NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD</p> <p>HQ OFFICE: HESRAH (HOUSE), G. BLOCK N MODEL TOWN EXTENSION, UPRIDE, PESHAWAR</p>	<p>PROJECT</p> <p>FEASIBILITY STUDY AND DETAILED DESIGN FOR PESHAWAR (CHAMKANI) TO NOWSHERA, ADDITION OF EXTRA LANE ON EACH SIDE OF N-5 (32 KM)</p>	<p>ENVIRONMENTAL SENSITIVE RECEPTORS MAP</p>		<p>SCALE</p> <p>1:2,500</p>																																									
				<p>DATE</p> <p>MAY-2022</p>	<p>FIG. NO.</p> <p>0</p>	<p>REV</p> <p>0</p>																																									
<table border="1"> <thead> <tr> <th>NO</th> <th>DESCRIPTION</th> <th>APPROVED</th> <th>EMPLOYED</th> <th>ISSUED</th> </tr> </thead> <tbody> <tr> <td>01</td> <td>DESIGNATION</td> <td></td> <td></td> <td></td> </tr> <tr> <td>02</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>03</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>04</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		NO	DESCRIPTION	APPROVED	EMPLOYED	ISSUED	01	DESIGNATION				02					03					04					<table border="1"> <thead> <tr> <th>DESIGN</th> <th>APPROVED</th> <th>EMPLOYED</th> <th>ISSUED</th> </tr> </thead> <tbody> <tr> <td>SUBMITTED</td> <td>RECOMMENDED</td> <td>CHANGED</td> <td></td> </tr> </tbody> </table>		DESIGN	APPROVED	EMPLOYED	ISSUED	SUBMITTED	RECOMMENDED	CHANGED		<table border="1"> <thead> <tr> <th>DESIGN</th> <th>APPROVED</th> <th>EMPLOYED</th> <th>ISSUED</th> </tr> </thead> <tbody> <tr> <td>SUBMITTED</td> <td>RECOMMENDED</td> <td>CHANGED</td> <td></td> </tr> </tbody> </table>		DESIGN	APPROVED	EMPLOYED	ISSUED	SUBMITTED	RECOMMENDED	CHANGED		<p>SCALE</p> <p>1:2,500</p>
NO	DESCRIPTION	APPROVED	EMPLOYED	ISSUED																																											
01	DESIGNATION																																														
02																																															
03																																															
04																																															
DESIGN	APPROVED	EMPLOYED	ISSUED																																												
SUBMITTED	RECOMMENDED	CHANGED																																													
DESIGN	APPROVED	EMPLOYED	ISSUED																																												
SUBMITTED	RECOMMENDED	CHANGED																																													



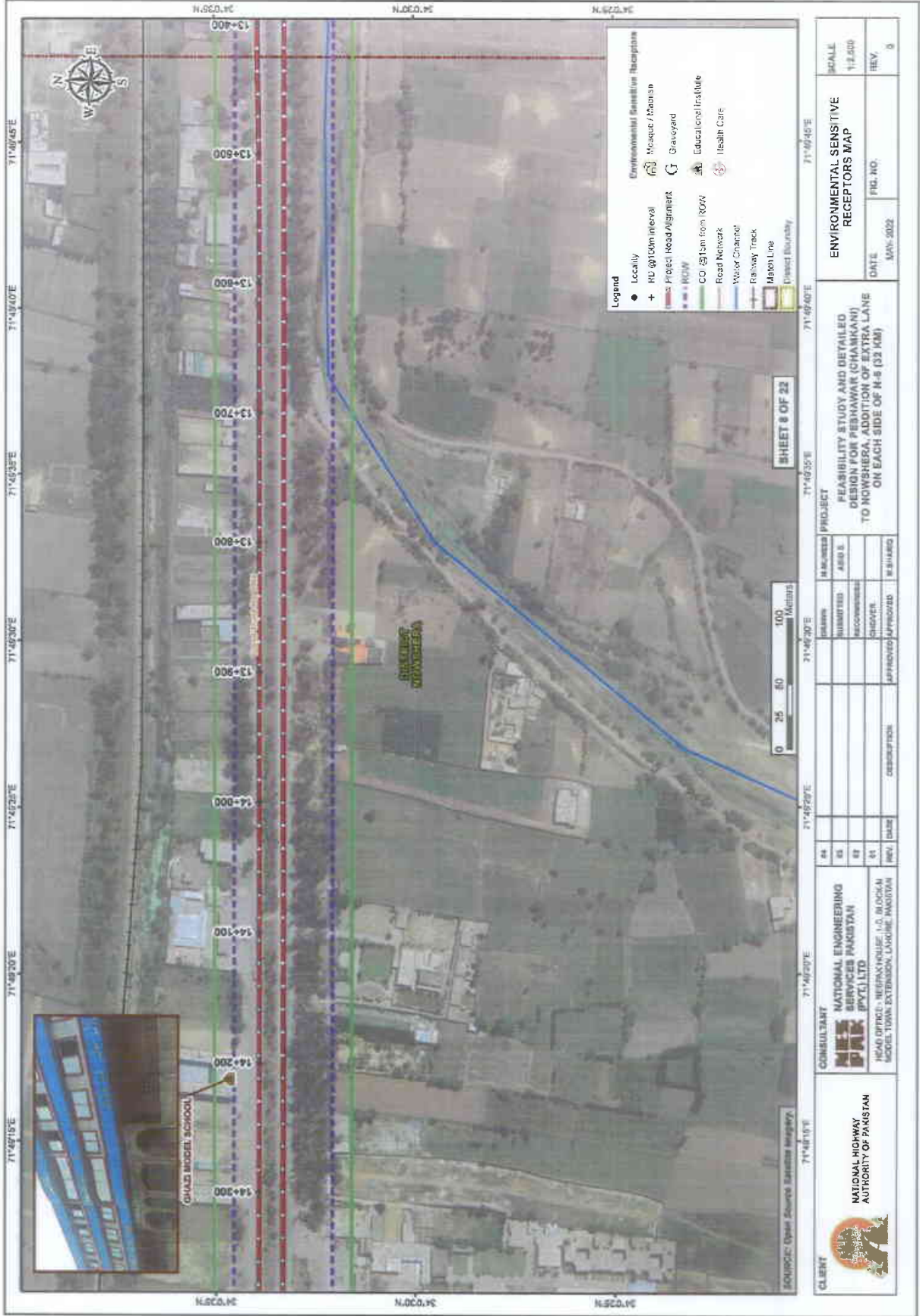
CLIENT	NATIONAL HIGHWAY AUTHORITY OF PAKISTAN
CONSULTANT	NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD HEAD OFFICE - NESPAK HOUSE, I-5, BLOCK N MODEL TOWN EXTENSION, LAHORE, PAKISTAN
PROJECT	FEASIBILITY STUDY AND DETAILED DESIGN FOR PESHAWAR (CHABKANI) TO NOWSHERA, ADDITION OF EXTRA LANE ON EACH SIDE OF N-5 (33 KM)
SCALE	1:2,500
ENVIRONMENTAL SENSITIVE RECEPTORS MAP	REV. 0
DATE	MAY-2022
F/G NO	

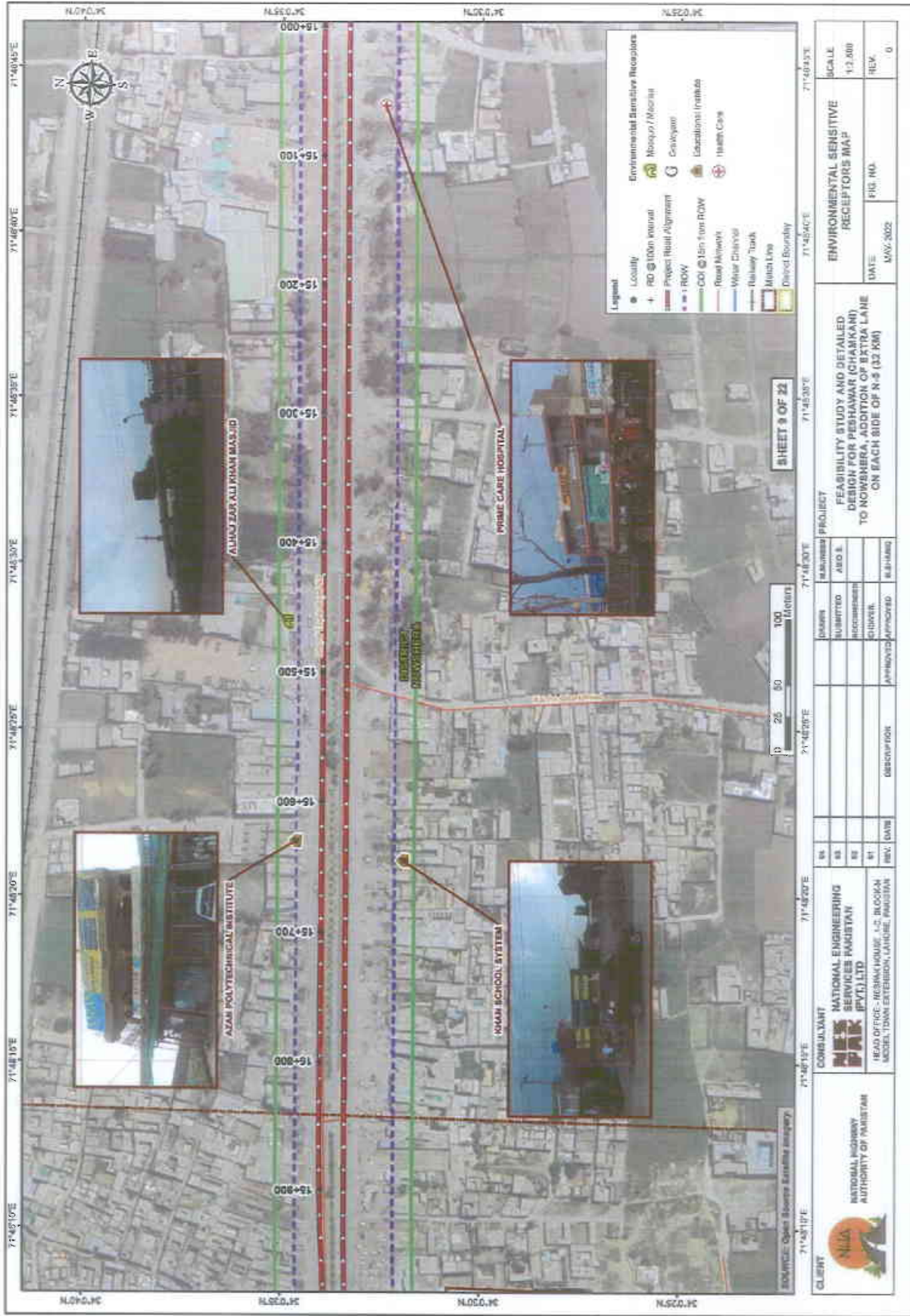
NO.	04	DATE	
REV.	03	DATE	
	02	DATE	
	01	DATE	
DESCRIPTION	APPROVED	APPROVED	APPROVED
DESIGNED BY	SHOBER	APPROVED BY	M. SHABOZ
CHECKED BY		APPROVED BY	
SUBMITTED BY		APPROVED BY	
DATE		APPROVED BY	

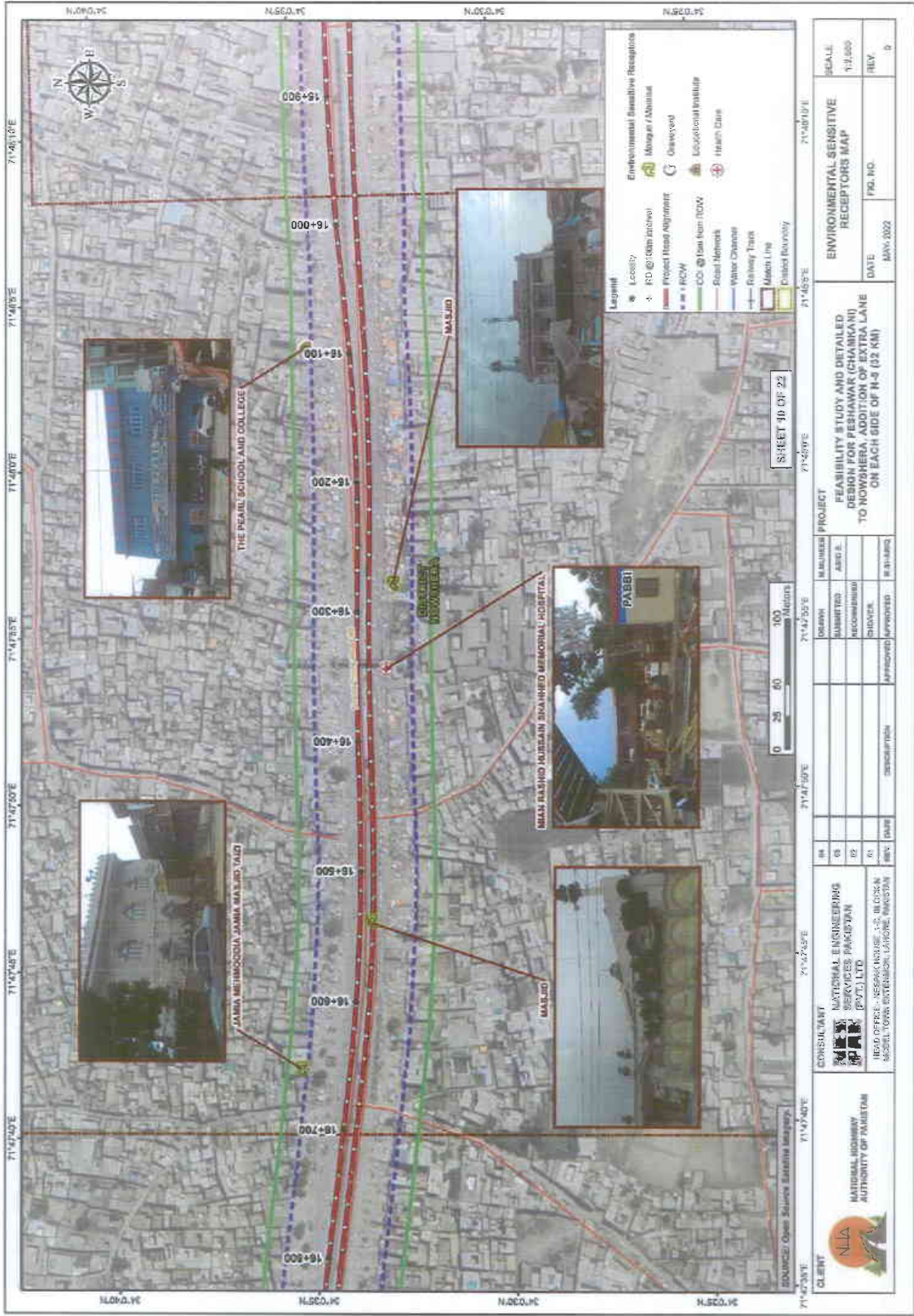
PROJECT	FEASIBILITY STUDY AND DETAILED DESIGN FOR PESHAWAR (CHABKANI) TO NOWSHERA, ADDITION OF EXTRA LANE ON EACH SIDE OF N-5 (33 KM)
SCALE	1:2,500
ENVIRONMENTAL SENSITIVE RECEPTORS MAP	REV. 0
DATE	MAY-2022
F/G NO	

NO.	04	DATE	
REV.	03	DATE	
	02	DATE	
	01	DATE	
DESCRIPTION	APPROVED	APPROVED	APPROVED
DESIGNED BY	SHOBER	APPROVED BY	M. SHABOZ
CHECKED BY		APPROVED BY	
SUBMITTED BY		APPROVED BY	
DATE		APPROVED BY	

NO.	04	DATE	
REV.	03	DATE	
	02	DATE	
	01	DATE	
DESCRIPTION	APPROVED	APPROVED	APPROVED
DESIGNED BY	SHOBER	APPROVED BY	M. SHABOZ
CHECKED BY		APPROVED BY	
SUBMITTED BY		APPROVED BY	
DATE		APPROVED BY	







CLIENT	NATIONAL HIGHWAY AUTHORITY OF PAKISTAN
CONSULTANT	NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD HEAD OFFICE - NESPAK HOUSE, S-2, BLOCK A MOHATTAR EXTENSION, LAHORE, PAKISTAN
DATE	MAY, 2022
SCALE	1:1,500
FIG. NO.	
REV.	0

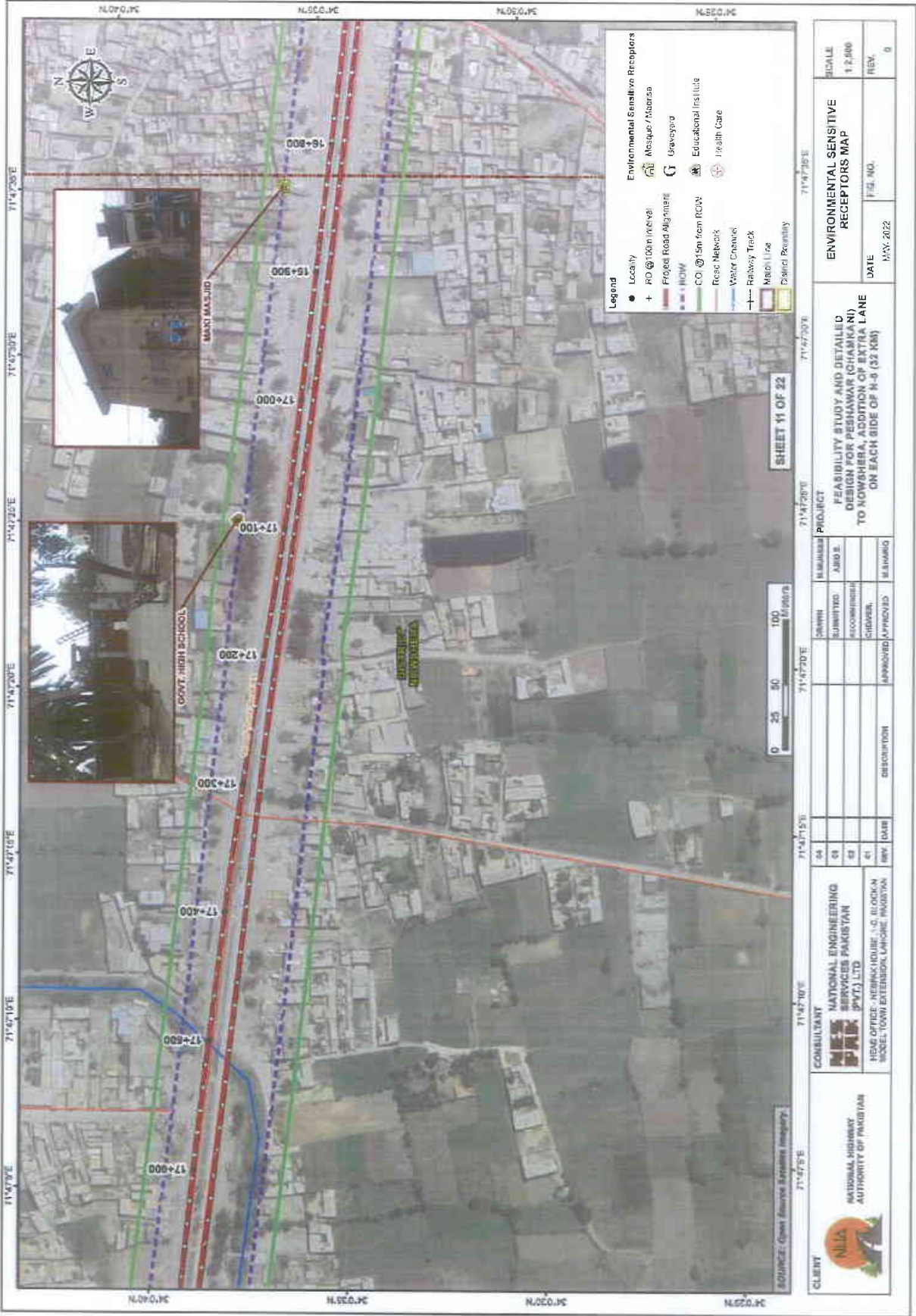
ENVIRONMENTAL SENSITIVE RECEPTORS MAP

PROJECT
 FEASIBILITY STUDY AND DETAILED DESIGN FOR PESHAWAR (CHANKARI) TO NOWSHERA, ADDITION OF EXTRA LANE ON EACH SIDE OF N-5 (12 KM)

NO.	DATE	REVISION
01		
02		
03		
04		
05		

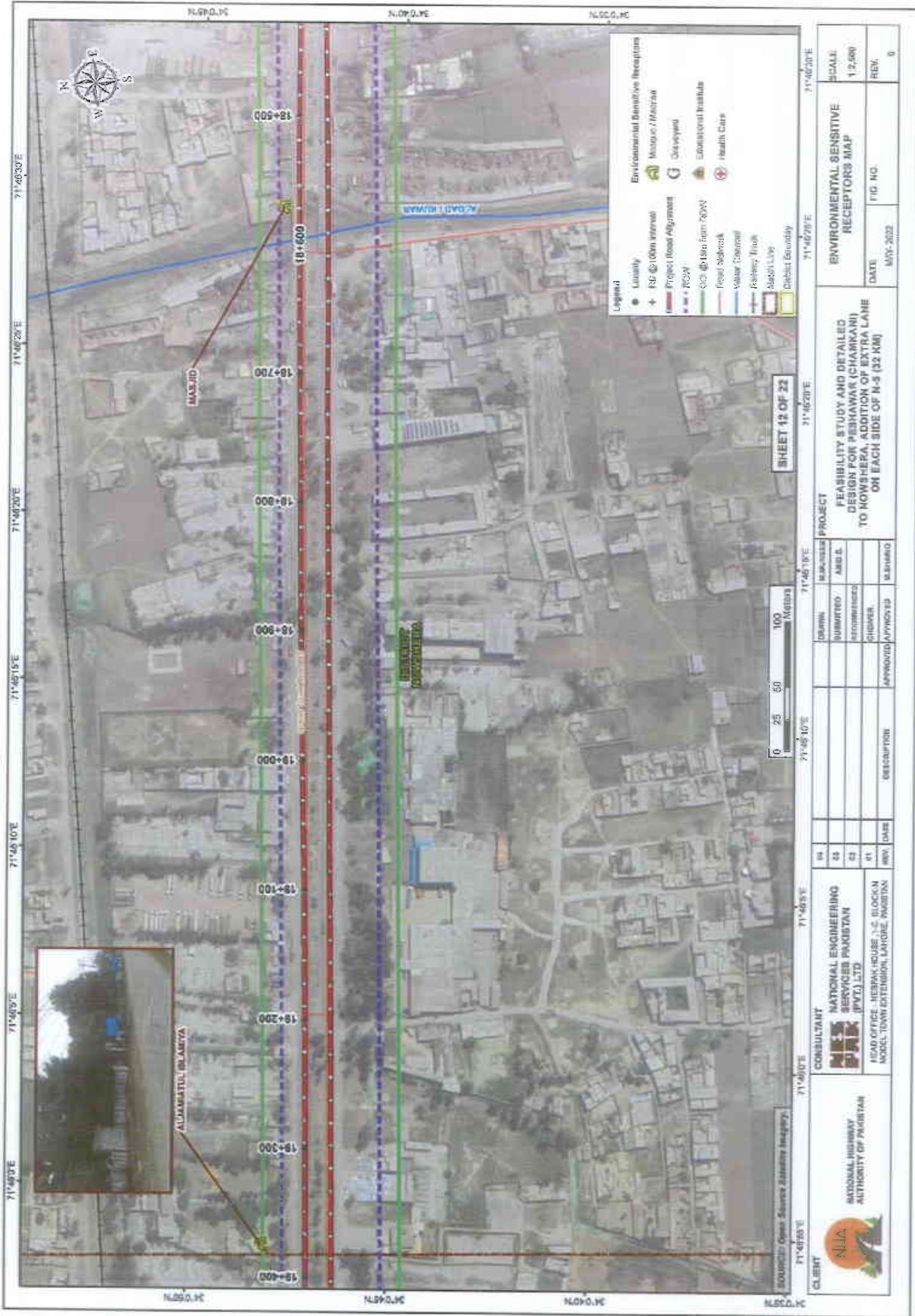
APPROVED	DATE

APPROVED	DATE

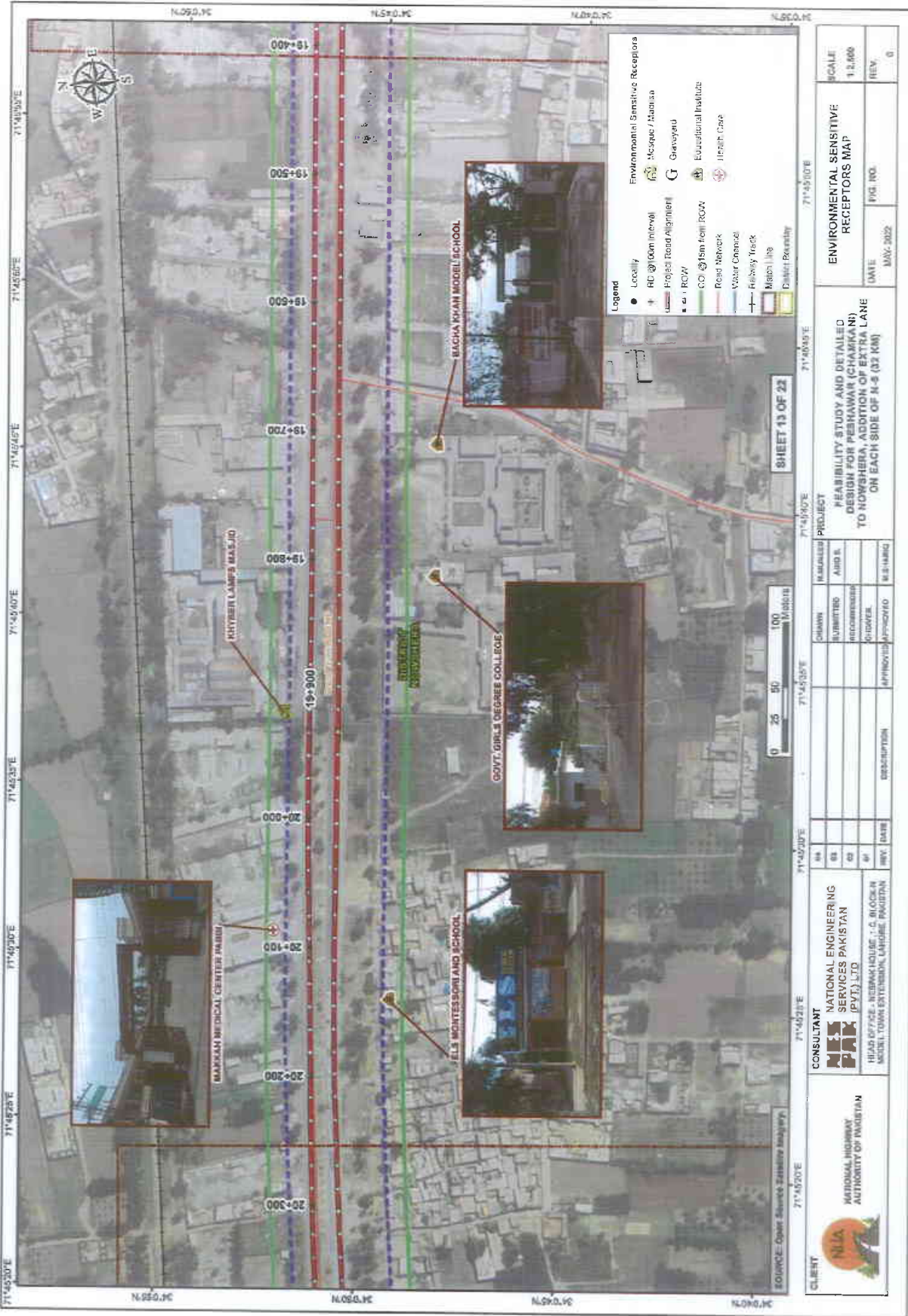


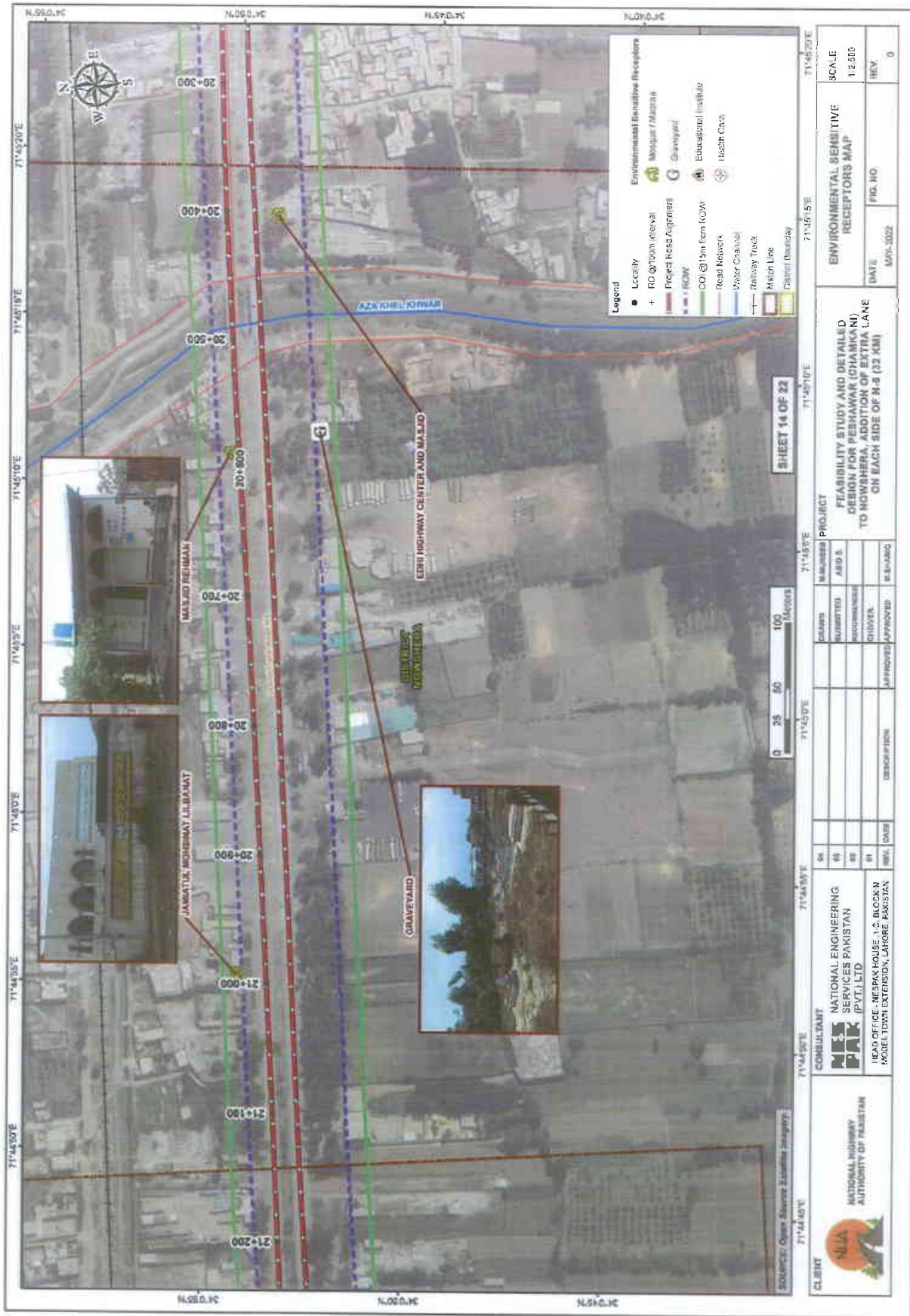
SHEET 11 OF 22

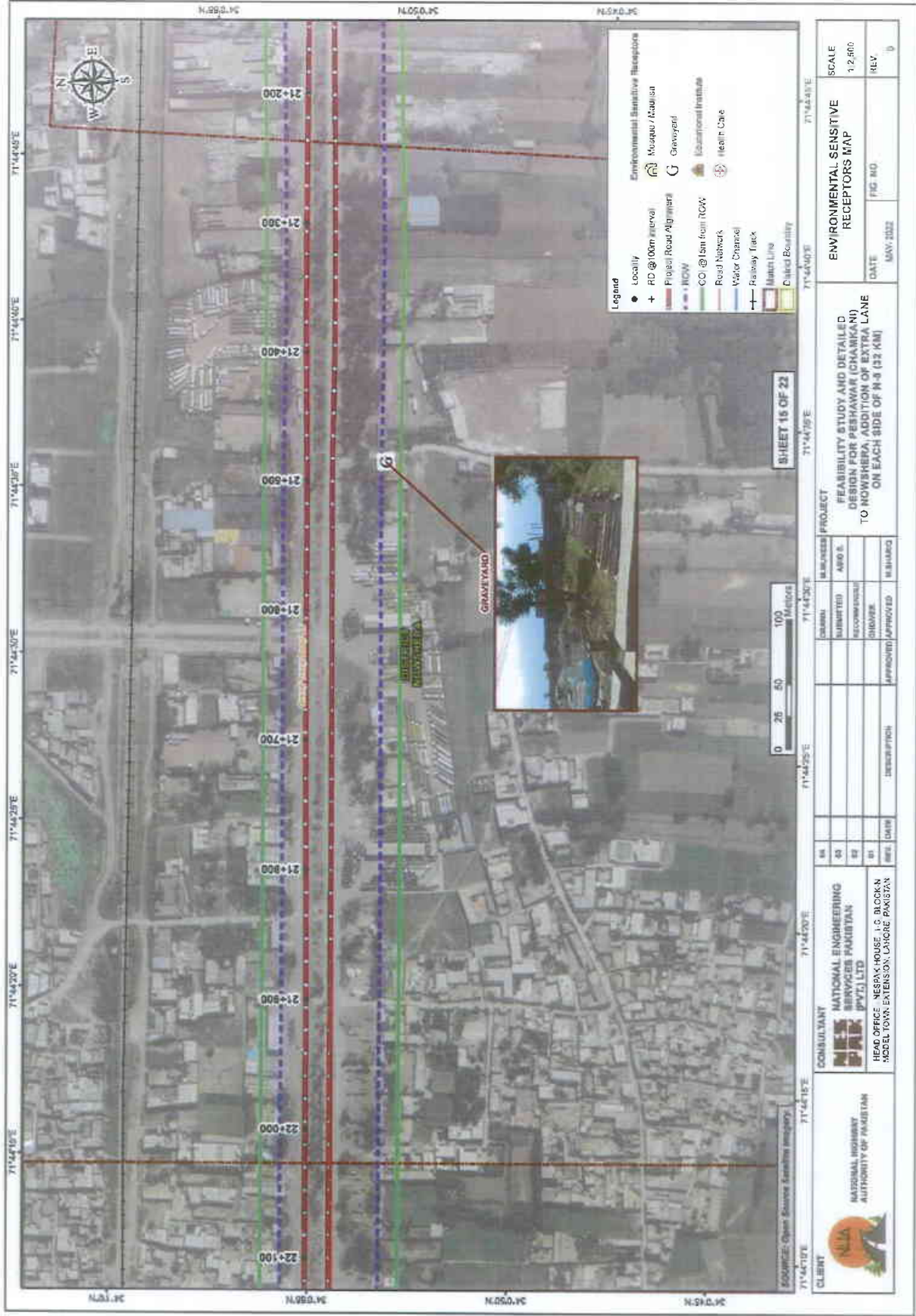
 NATIONAL HIGHWAY AUTHORITY OF PAKISTAN	CLIENT	 NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD HEAD OFFICE: HENSAKURHURE, S.O. BLOCK 4 MODEL TOWN EXTENSION, LAHORE, PAKISTAN	<table border="1"> <tr> <th>REV.</th> <th>DATE</th> <th>DESCRIPTION</th> <th>APPROVED BY</th> <th>DATE</th> </tr> <tr> <td>01</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>02</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>03</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>04</td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	REV.	DATE	DESCRIPTION	APPROVED BY	DATE	01					02					03					04					PROJECT FEASIBILITY STUDY AND DETAILED DESIGN FOR PROPOSED 6 (6 LANE IN) TO NOWSHERA, ADDITION OF BITUM LANE ON EACH SIDE OF N-0 (32 KM)	ENVIRONMENTAL SENSITIVE RECEPTORS MAP	SCALE 1:2,000
				REV.	DATE	DESCRIPTION	APPROVED BY	DATE																							
01																															
02																															
03																															
04																															
DATE MAY, 2022	FIG. NO. 9																														



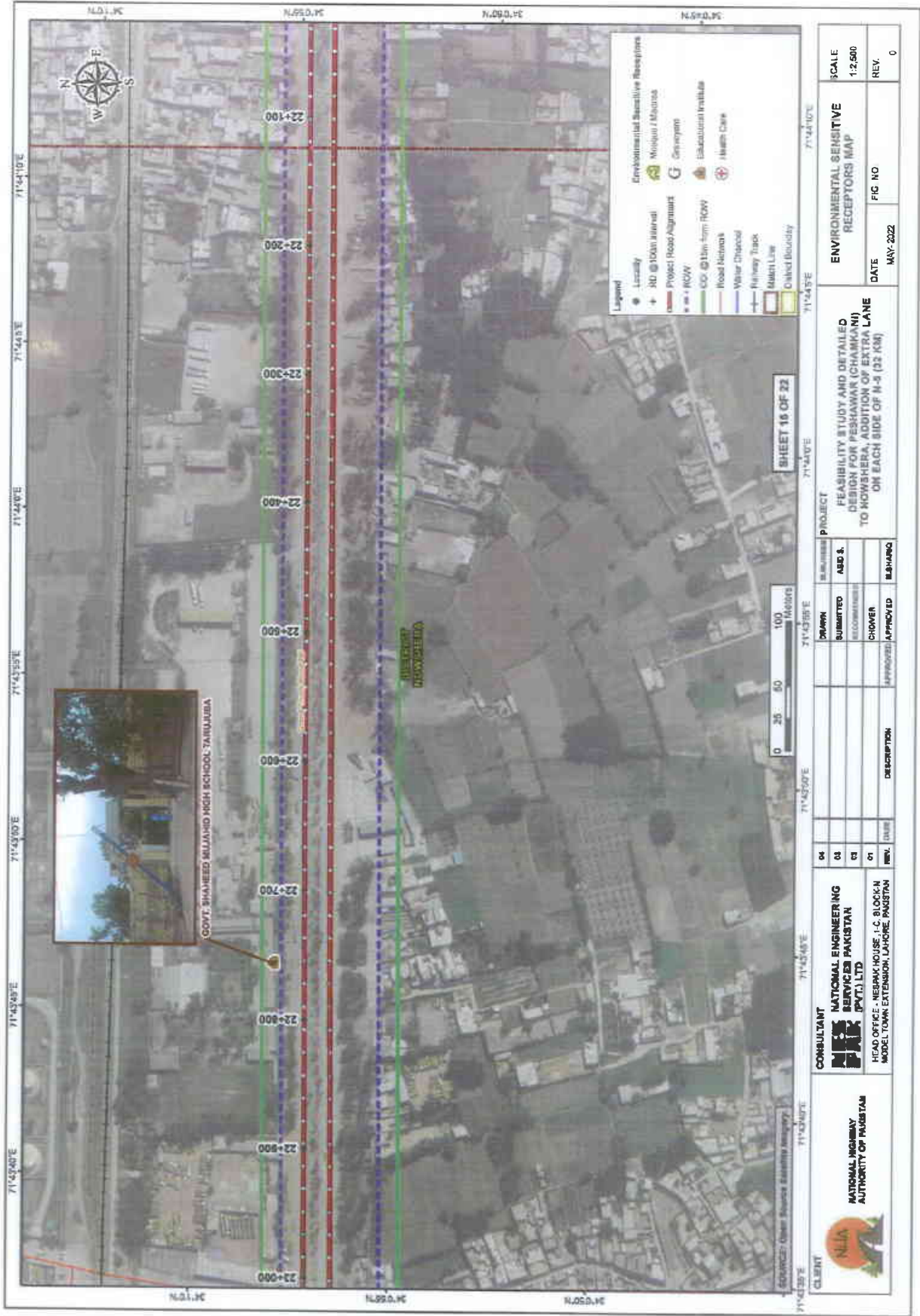
 NATIONAL HIGHWAY AUTHORITY OF PAKISTAN	CONSULTANT NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD HEAD OFFICE - HERAK HOUSE 7-C BLOCK N MODEL TOWN EXTENSION LARORE, PUNJAB		PROJECT FEASIBILITY STUDY AND DETAILED DESIGN FOR PEHAWAR (CHAKKARI) TO NOWSHERA, ADDITION OF EXTRA LANE ON EACH SIDE OF N-5 (32 KM)		ENVIRONMENTAL SENSITIVE RECEPTORS MAP	
	CLIENT NIA	DATE MAY-2023	FIG. NO. 0	SCALE 1:2,500	REVISIONS 0	SHEET NO. 12 OF 22



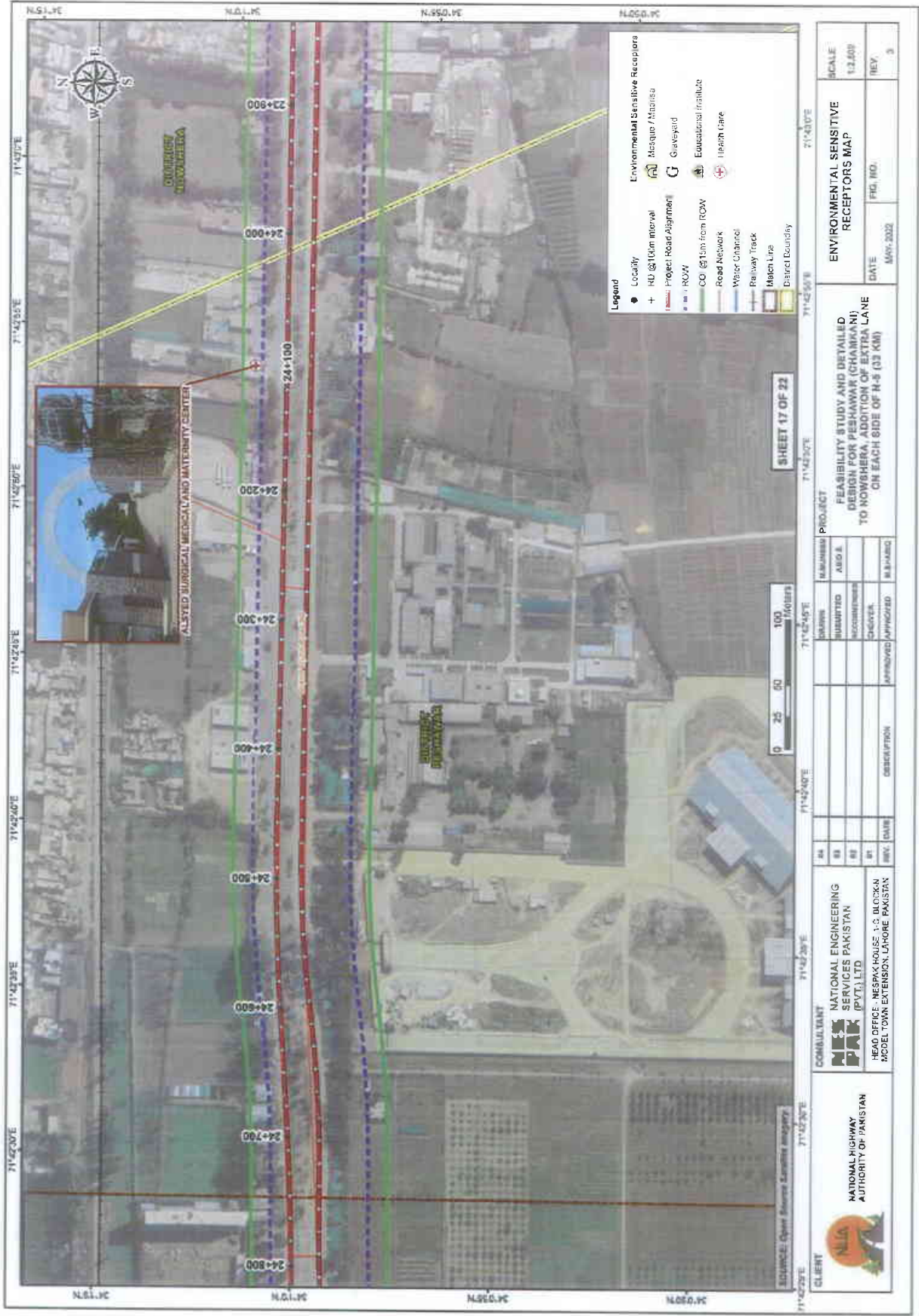




 NATIONAL HIGHWAY AUTHORITY OF PAKISTAN	CONSULTANT NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD HEAD OFFICE: NESPAK HOUSE, I.C. BLOCK, MODEL TOWN, EXTENSION, LAHORE, PAKISTAN		CLIENT NATIONAL HIGHWAY AUTHORITY OF PAKISTAN	
	DATE: MAY, 2022	FIG. NO.	SCALE: 1:2,500	REV.
PROJECT FEASIBILITY STUDY AND DETAILED DESIGN FOR PRESHAWAR (CHANKIANO) TO NOWHERA, ADDITION OF EXTRA LANE ON EACH SIDE OF N-3 (32 KM)		SUBMITTED:	APPROVED:	
DRAWN:	CHECKED:	RECOMMENDED:	REVISIONS:	
DATE:	DATE:	DATE:	DATE:	



<p>NATIONAL HIGHWAY AUTHORITY OF PAKISTAN</p>	<p>CONSULTANT</p> <p>NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD</p> <p>HEAD OFFICE - NERPAK HOUSE, I.C. BLOCK N MODEL TOWN EXTENSION, LAHORE, PAKISTAN</p>	04																		
		03																		
		02																		
		01																		
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED	CHOWER	RECOMMENDED	SUBMITTED	ADD. I.	REVISIONS	DATE	BY	DATE	BY	DATE	BY	DATE	BY	
<p>PROJECT</p> <p>FEASIBILITY STUDY AND DETAILED DESIGN FOR PESHAWAR (CHAKRI-N) TO KOWHERA, ADDITION OF EXTRA LANE ON EACH SIDE OF N-5 (32 KM)</p>											<p>ENVIRONMENTAL SENSITIVE RECEPTORS MAP</p>		SCALE	1:2,500						
<p>CLIENT</p> <p>NATIONAL HIGHWAY AUTHORITY OF PAKISTAN</p>											<p>DATE</p> <p>MAY-2022</p>		FIG NO							
											<p>REV.</p> <p>0</p>									



Legend

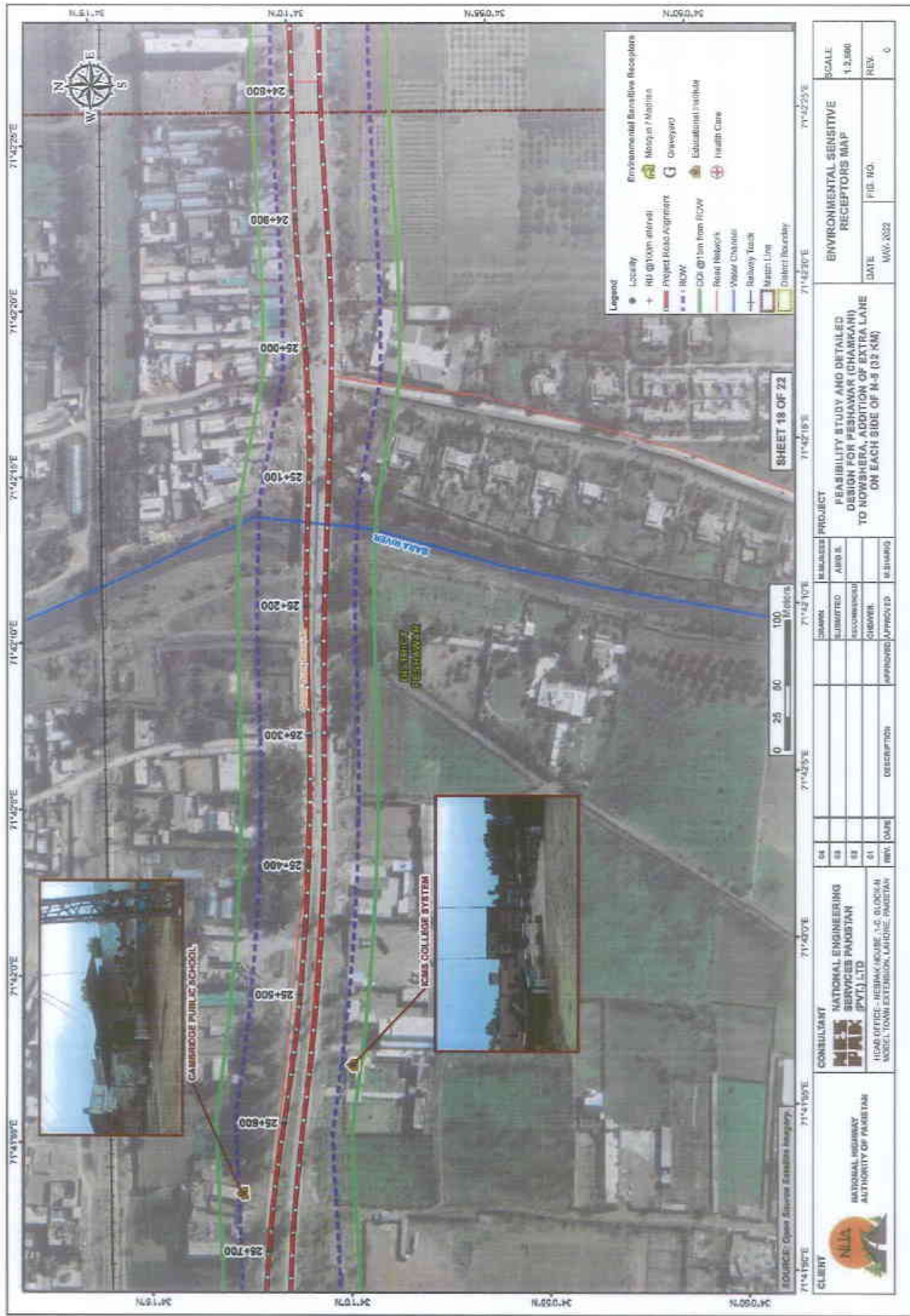
- Locality
- + HD @ 10m interval
- Project Road Alignment
- ROW
- CO @ 15m from ROW
- Road Network
- Water Channel
- Railway Track
- Match Line
- District Boundary

Environmental Sensitive Receptors

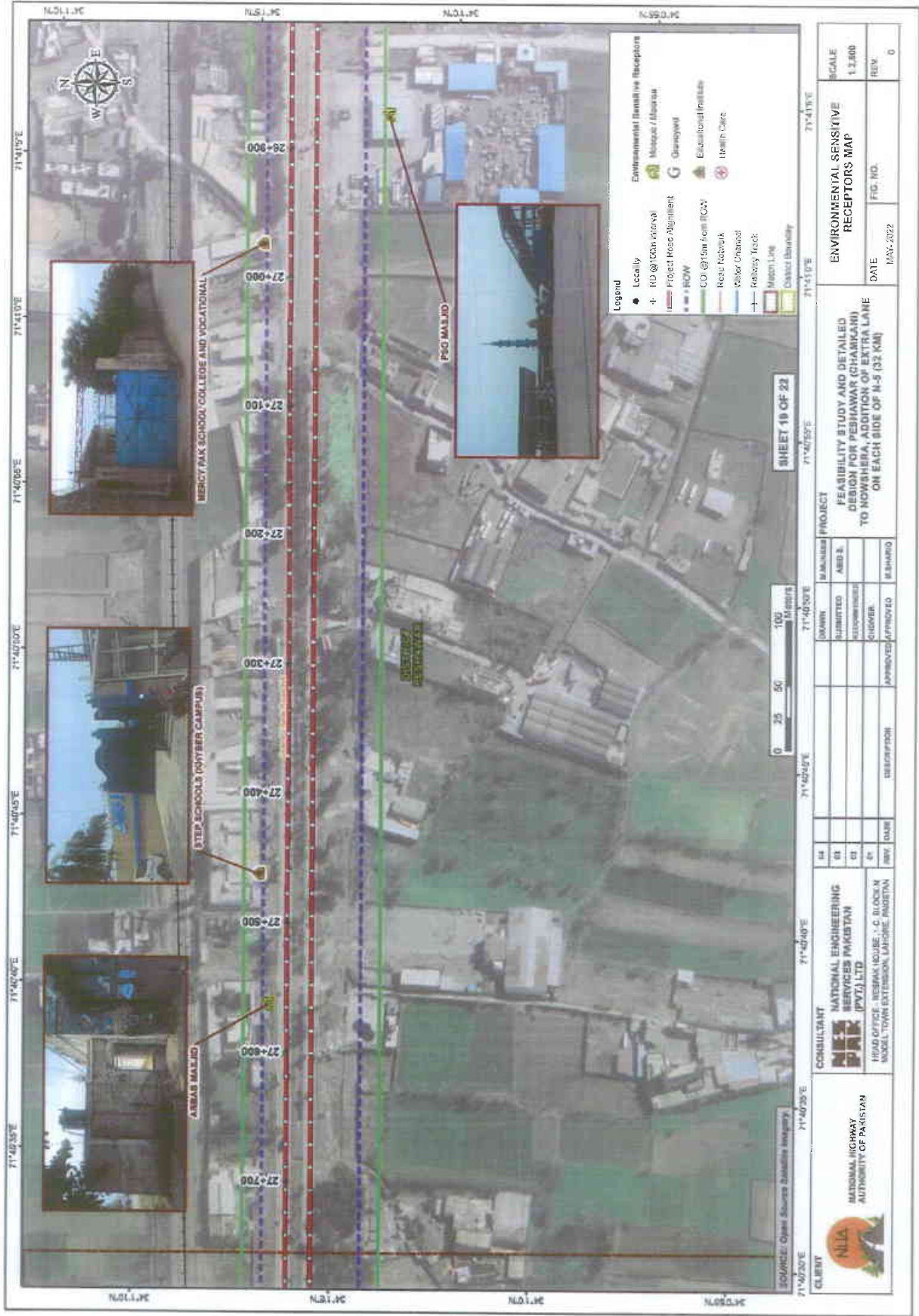
- Mesquita / Masjid
- Graveyard
- Educational Institute
- Health Care

SHEET 17 OF 22

NATIONAL HIGHWAY AUTHORITY OF PAKISTAN		CLIENT	
CONSULTANT NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD HEAD OFFICE: NESPAK HOUSE 1-C BLOCK MODEL TOWN EXTENSION, LAHORE, PAKISTAN		PROJECT FEASIBILITY STUDY AND DETAILED DESIGN FOR PESHAWAR (CHAKHANI) TO NOWSHERA ADDITION OF EXTRA LANE ON EACH SIDE OF N-5 (32 KM)	
NO.	REV.	DATE	DESCRIPTION
01			ISSUED FOR CHECK
02			APPROVED
03			APPROVED
04			APPROVED
ENVIRONMENTAL SENSITIVE RECEPTORS MAP		DATE: MAR-2022	FIG. NO.:
SCALE: 1:2,500		REV: 3	



 NATIONAL HIGHWAY AUTHORITY OF PAKISTAN	CONSULTANT  NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD HEAD OFFICE - HEBBAK HAUZE, P.O. GLOCKHAI, MODEL TOWN EXTENSION, LAHORE, PAKISTAN	DATE NOV. 2022	FILE NO. _____	SCALE 1:2,500	REV. 0
		ENVIRONMENTAL SENSITIVE RECEPTORS MAP			PROJECT FEASIBILITY STUDY AND DETAILED DESIGN FOR PESHAWAR (GHAMKANI) TO NOWSHERA, ADDITION OF EXTRA LANE ON EACH SIDE OF N-5 (3.2 KM)
CLIENT NATIONAL HIGHWAY AUTHORITY OF PAKISTAN		APPROVED APPROVED		REVISIONS	
NO.	DATE	DESCRIPTION	APPROVED	APPROVED	APPROVED
04					
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					



DATE	MAY-2022	FIG. NO.	
SCALE	1:2,500	REV.	0

ENVIRONMENTAL SENSITIVE RECEPTORS NIAP

FEASIBILITY STUDY AND DETAILED DESIGN FOR PESHAWAR (CHAMKANI) TO NOWSHERA, ADDITION OF EXTRA LANE ON EACH SIDE OF N-3 (32 KM)

PROJECT	APPROVED	APPROVED	APPROVED
DESIGNED	DESIGNED	DESIGNED	DESIGNED
APPROVED	APPROVED	APPROVED	APPROVED

DESIGNED	DESIGNED	DESIGNED	DESIGNED
APPROVED	APPROVED	APPROVED	APPROVED

CONSULTANT	NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD
HEAD OFFICE - NEESPAK HOUSE, 1-C BLOCK M MODEL TOWER EXTENSION, LAHORE, PAKISTAN	

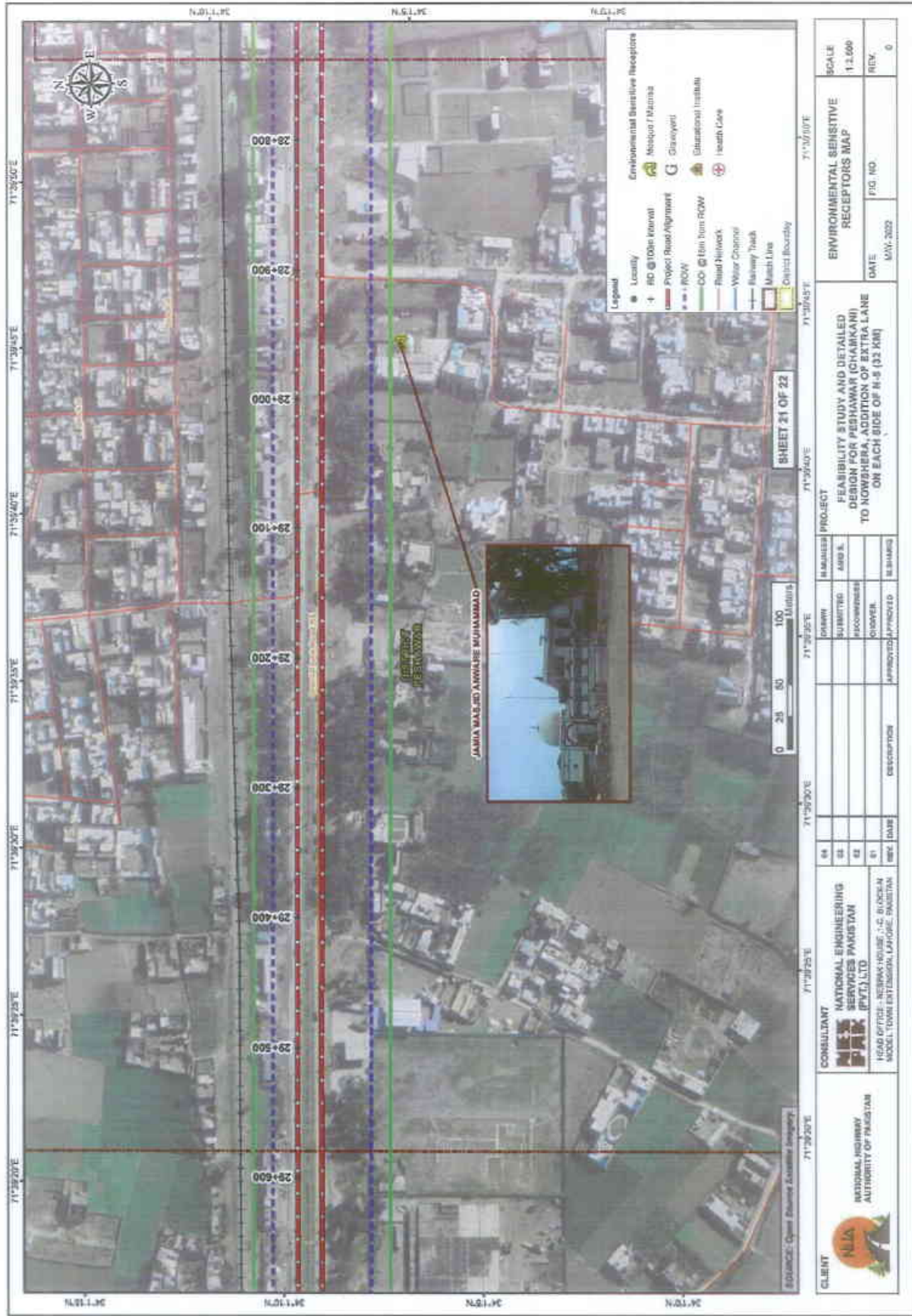
CLIENT

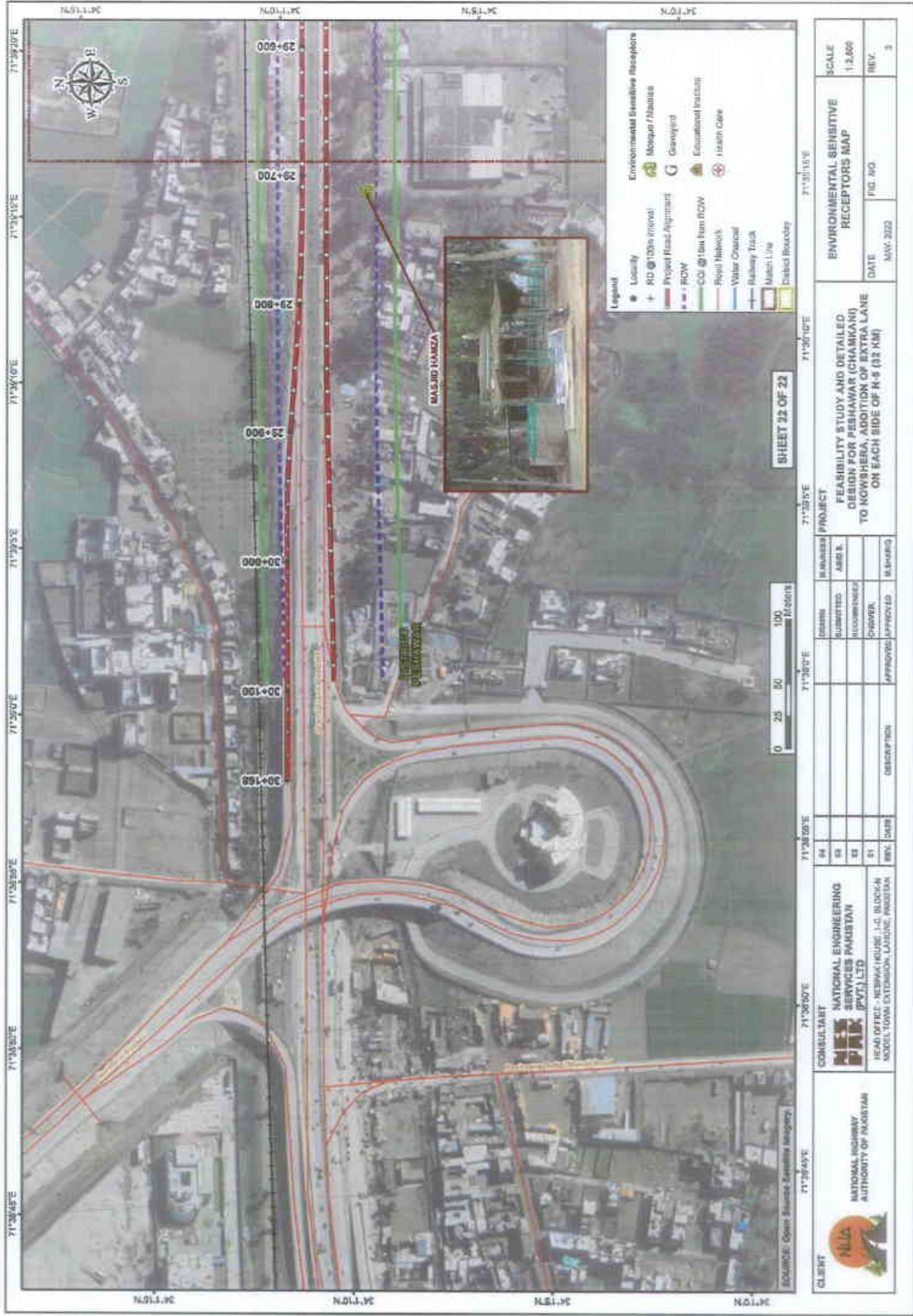


NATIONAL HIGHWAY AUTHORITY OF PAKISTAN



 NATIONAL HIGHWAY AUTHORITY OF PAKISTAN	CONSULTANT NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD HEAD OFFICE: ANESPAK HOUSE, 4-C, BLOCK 'N' MODEL TOWN EXTENSION, LAHORE, PAKISTAN		04 03 02 01 REV	SUBMITTED RECOMMENDED APPROVED APPROVED	PROJECT No S W.S. NO.	ENVIRONMENTAL SENSITIVE RECEPTORS MAP	SCALE: 1:2,500 RCV: 0
	DATE: MAY-2022	FIG. NO.	PROJECT TITLE: FEASIBILITY STUDY AND DETAILED DESIGN FOR PESHAWAR (CHARKKI MI) TO NOWSHERA, ADDITION OF EXTRA LANE ON EACH SIDE OF N-3 (33 KM)	DATE: MAY-2022	FIG. NO.	SCALE: 1:2,500 RCV: 0	





**ANNEX-IV: LIST OF PARTICIPANTS
OF FOCUS GROUP DISCUSSIONS**

ANNEX-IV

LIST OF PARTICIPANTS-COMMUNITY CONSULTATIONS

Sr. No.	Name of Participants	Occupation
1:- Nasir Pur Phatak		
1	M Sarwar s/o M.Jamil	Business
2	M. Iqbal s/o Shair Afzal	Mechanic
3	Fiaz Ahmad s/o M. tehsin	Shopkeeper
4	Amir Khan s/o Pervez Khan	Business
5	Kamran Khan s/o Aziz Khan	Mechanic
6	Tariq Javed s/o M. Rafiq	Mechanic
2:- Pubbi Station		
1	Yusaf Khan s/o Lal Shair	Labor
2	Imran Ullah s/o Aziz Ullah	Labor
3	M. Rehman s/o Murad Khan	Business
4	Fazal Rehman s/o Aziz Rehman	Labor
5	Amjad Khans/o Mumtaz Khan	Labor
6	Mujahid s/o Munir Khan	Mechanic
7	Azhar Ali s/o Gohar Ali	Business
3:- Pubbi Bazar		
1	Irfan Mehmood s/o Mehmood Khan	Shopkeeper
2	Hashmat Ali s/o Ameer Ullah	Shopkeeper
3	Arshad Khan s/o Sami Jan	Shopkeeper
4	M.Nadeem s/o M. Shareef	Labor
5	M. Habib s/o Habib Ur Rehman	Business
6	Gohar Ali s/o Habib Ur Rehman	Business
7	Nabi Rehman s/o Shamas Ur Rehman	Labor
8	Ameer Jan s/o M. Ali	Labor
9	M. Zahid s/o Ali Akbar	Labor
4:- Khatak Kalay		
1	Fazal Bacha s/o Nisar Muhammad	Hotel Operator
2	Niaz Ali Khan s/o Akhtar Zaman	Labor
3	Luqman s/o Wajid Ali	Driver
4	M. Sohail s/o Janat Gull	Driver
5	Zahid Khan s/o Zahur Khan	Labor
6	Subhan Ullah s/o Safi Ullah	Labor
7	Zain Ullah s/o Pervez Khan	Labor
8	Shoaib Alam s/o Sultan Muhammad	Business
9	M. Sarwar s/o Abdul Akbar	Shopkeeper
10	Javed Khan s/o Khan Shair	Shopkeeper
11	Inam Khan s/o M. Shair	Hotel Operator

**ANNEX-V: GUIDELINE FOR
CONTRACTOR'S TMP**

GUIDELINE TRAFFIC MANAGEMENT PLAN

1. Need for Plan

During the construction period of the project, considerable vehicular movement carrying large amounts of material and machinery is expected. This will definitely interrupt the local traffic and is therefore important to manage the traffic to avoid the nuisance to local residents in terms of noise, dust, congestion and inconvenience.

2. The Plan

The objective of Traffic Management Plan (TMP) is to define the requirements that should be implemented to mitigate any potential negative risks to the environment, workers or the community resulting from construction traffic.

The TMP will advise and inform site Contractors and external suppliers of equipment and materials of access and entry points along with other key information such as tipping areas and wash-out areas. It is intended to compliment and work alongside relevant EMP. The TMP will be classed as "live" and therefore be subjected to updates as required.

The Contractor, at the time of the execution of the project, will prepare a comprehensive TMP in coordination with local traffic police department, PMU NHA, emergency services and local administrative department. PMU NHA and CSC will review and approve the Contractor's TMP. The Contractor's TMP shall include following mitigation measures during its preparation:

- Undertake a road conditions assessment prior to and following the peak construction period, to assess any damage to road infrastructure that can be attributed to Project development.
- Repair damage as appropriate or enter into a voluntary agreement with the relevant roads authority to reimburse the cost of any repairs required to the public road network as a result of the Project.
- Spoil dumpsites located close to project site to minimize journey distance and limit movements to site access roads.
- Construction of worker accommodation on site to reduce light vehicle movements relating to travel to/ from the site.
- Provision of bus/minibus services for personnel living in nearby settlements.
- Movements of construction workers will be planned to avoid the busiest roads and times of day when traffic is at its greatest.
- Schedule deliveries and road movements to avoid peak periods.
- Driver training for HGV drivers and refresher course every six months for project drivers.
- Speed restrictions for project traffic travelling through communities (to be agreed with National Highway Authority).
- Run a safety campaign to improve the people's knowledge of the traffic hazard on their roads, public information and other activities to address the issues.
- Run a pedestrian awareness programme.
- Temporary signage

ANNEX-V

The traffic management plan for the project corridor is provided below.

3. Other Recommendations

It is important to manage public access routes during construction because it can cause delay to local traffic and create a safety hazard both on and offsite. People working and living near the tower sites would be annoyed by the emissions, noise and visual intrusion of queuing vehicles. Some important factors involved in access routes and site traffic are as follows:

i. Public Access Routes

The use of public road for site access may be restricted in terms of:

- Vehicle size, width and type of load
- Time limits
- Parking
- Pedestrian conflicts

Contractor should have consultation with the local police or local authority to address these issues and to effectively manage them before the beginning of the construction.

ii. Site Workers Traffic

Site personnel should not be permitted to park vehicles right on the road; this will lead to disruption in material deliveries. Designated parking areas with appropriate parking space will be needed for this purpose; any plain area near construction site can be used for this purpose.

iii. Site Rules

- Access to and from the site must be only via the specified entrance.
- On leaving the site, vehicles must be directed to follow the directions given.
- Drivers must adhere to the site speed limits.
- All material deliveries to site must keep allocated time limits.
- No material or rubbish should be left in the loading-unloading area.
- Develop a map for alternate routes showing material delivery services.
- Assign designated personnel on site to receive deliveries and to direct the vehicles.
- Monitor vehicle movement to reduce the likelihood of queuing or causing congestion in and around the area.
- Project vehicles should have a unanimous badge or logo on windscreen displaying that they belong to the project.

4. Contractor's Obligation

The traffic management plan of the Contractor should be safe enough and widening of any access roads and construction of the detours (as applicable and practical) must be completed

ANNEX-V

prior to start of project construction activities so that heavy vehicular transportation for construction activities do not hinder the normal course of traffic lanes. Contractor must ensure that road closures are carried out by a competent person. The Contractor obligation must include the display of traffic signs according to the need to divert the traffic volume and to guide the road users in advance. The traffic sign, traffic light should be placed from any diverting route or road marking.

The Contractor should consider the environmental and social impacts of the traffic during construction. It will be sole responsibility of the Contractor to implement a plan which produces minimum nuisance to the local people and to the environment. Safety of the people should be given due importance. It will be under Contractor obligation to notify the traffic management plan and its later changes to CSC, PMU-RD, emergency services and Traffic Police, and also publish weekly programme in the local newspaper.

5. Rail Road Crossings

The guidelines for highway-rail grade crossing perspectives have been extracted from Guidance on Traffic Control Devices at Highway-Rail Grade Crossings by U.S. Department of Transportation (Federal Highway Administration, 2002). These may be used by the Contractor as a guidelines during the construction phase to prepare a detailed TMP. These are elaborated hereunder:

The important elements required for "safe" passage through the crossing, which are the same elements a driver needs for crossing a highway-highway intersection are:

Advance Notice - Stopping Sight Distance

The first step pertains to "stopping" or "braking" sight distance, which is the ability to see a train and/or the traffic control device at the crossing ahead sufficiently in advance so that a driver can bring the vehicle to a safe, controlled stop at least 4.5 m (15 ft) short of the near rail, if necessary. This applies to either a passive or active controlled crossing. Stopping sight distance is measured along the roadway and is a function of the distance required for the "design" vehicle, traveling at the posted speed limit to safely stop. Insufficient stopping sight distance is often due to poor roadway geometry and/or surrounding topography.

Safe Approach Speed

The Contractor should designate a flag man to control the speed of construction and private vehicles that should control both the traffic and the speed. This flag man should ensure to maintain the safe distance for all type of traffic from the railway crossings to avoid any hazard.

Coordination with Pakistan Railways

The Proponent should obtain prior approval from Pakistan Railways to start the construction. Moreover, the Contractor and the Proponent should coordinate with Pakistan Railways to accommodate the railway traffic during the entire construction phase and if required may update the traffic management plan accordingly.

**ANNEX-VI: CONTRACTOR'S
OCCUPATIONAL HEALTH AND
SAFETY PLAN**

ANNEX-VI

GUIDELINE OCCUPATIONAL HEALTH AND SAFETY PLAN

Occupational Health and Safety covers all personnel working under the project and will be in line with the World Bank EHS guidelines on health and safety.

The Occupational Health and Safety program will aim to ensure that the workplace is safe and healthy by: addressing the hazards and risks at the workplace; outlining the procedures and responsibilities for preventing, eliminating and minimizing the effects of those hazards and risks; identifying the emergency management plans for the workplace or workplaces; and, specifying how consultation, training and information are to be provided to employees at various workplaces.

Some of the risks/hazards associated with workplaces are due to working close to or at sites associated with the various project construction activities. Other risks associated with the project construction phase include risk of increase of vector borne and other different diseases.

The following sections will be implemented during the construction phase to address and ensure workers' health and safety.

SCREENING AND REGULAR UNANNOUNCED CHECKING OF WORKERS

As per the procedure for hiring workers, all contractors and labor agencies are required to make all prospective workers undergo medical tests to screen for diseases and sicknesses, prior to selection and employment of any worker. The contractor is also responsible for ensuring that no worker who has a criminal record is employed at the project site. It will be ensured that all workers undergo medical tests to screen diseases at source and at sites in consultation with the designated Health Officer.

In addition to this, the Project Management will also undertake sudden, unannounced checks on workers to look for diseases such as COVID-19, HIV, STDs, and hepatitis and take necessary steps as mandated by the Contractual agreement between the Contractor and the Worker(s).

MINIMIZING HAZARDS AND RISKS AT THE WORKPLACE

To ensure safety at all work sites, the following will be carried out:

- i. Installation of signboards and symbols in risky and hazardous areas, to inform workers to be careful.
- ii. Construction of barricades around construction sites and deep excavated pits, to cordon off and deter entry of unauthorized personnel and workers into these areas.
- iii. Providing a safe storage site/area for large equipment such as power tools and chains, to prevent misuse and loss.
- iv. Proper Housekeeping: Ensuring that materials are all stacked, racked, blocked, interlocked, or otherwise secured to prevent sliding, falling, or collapse. Brick stacks will not be more than 7 feet in height and for concrete blocks they will not be more

ANNEX-VI

- than 6 feet high.
- v. Removing all scrap timber, waste material and rubbish from the immediate work area as the work progresses.
 - vi. Where scaffolds are required, ensuring that each scaffold or its components shall be capable of supporting its own weight and at least 4 times the maximum intended load applied or transmitted to it. The platform/scaffold plank shall be at least 15 inches wide and 1.5 inches thick. The rope should be capable of supporting at least 6 times the maximum intended load applied or transmitted to that rope. Pole scaffolds over 60 feet in height shall be designed by a registered professional engineer and shall be constructed and loaded in accordance with that design. Where scaffolds are not provided, safety belts/safety nets shall be provided;
 - vii. Ensure that all ramps or walkways are at least 6 feet wide, having slip resistance threads and not inclined at more than a slope of 1 vertical and 3 horizontal.
 - viii. Stacking away all excavated earth at least 2 feet from the pit to avoid material such as loose rocks from falling back into the excavated area and injuring those working inside excavated sites.
 - ix. Constructing support systems, such as bracing to adjoining structures that may be endangered by excavation works nearby.
 - x. Only a trained electrician to construct, install and repair all electrical equipment to prevent risks of electrical shocks and electrocution.
 - xi. Install fire extinguishers and/or other fire-fighting equipment at every work site to prepare for any accidental fire hazards.

PROVISION OF PERSONAL PROTECTIVE EQUIPMENT

Risks to the health and safety of workers can be prevented by provision of Personal Protective Equipment (PPEs) to all workers. This will be included in the construction cost for each Contractor. Depending on the nature of work and the risks involved, contractors must provide without any cost to the workers, the following protective equipment:

- i. High visibility clothing for all personnel during road works must be mandatory.
- ii. Helmet shall be provided to all workers, or visitors visiting the site, for protection of the head against impact or penetration of falling or flying objects.
- iii. Safety belt shall be provided to workers working at heights (more than 20 ft) such as roofing, painting, and plastering.
- iv. Safety boots shall be provided to all workers for protection of feet from impact or penetration of falling objects on feet.
- v. Ear protecting devices shall be provided to all workers and will be used during the occurrence of extensive noise.
- vi. Eye and face protection equipment shall be provided to all welders to protect against sparks.
- vii. Respiratory protection devices shall be provided to all workers during occurrence of fumes, dusts, or toxic gas/vapor.
- viii. Safety nets shall be provided when workplaces are more than 25 feet (7.5 m) above the ground or other surfaces where the use of ladders, scaffolds, catch platforms, temporary floors or safety belts is impractical.

ANNEX-VI

The specific PPE requirements for each type of work are summarized below.

Table 1: PPE Requirement List

Type of Work	PPE
Elevated work	Safety helmet, safety belt (height greater than 20 ft), footwear for elevated work.
Handling work safety	Helmet, leather safety shoes, work gloves.
Welding and cutting work	Eye protectors, shield and helmet, protective gloves.
Grinding work	Dust respirator, earplugs, eye protectors.
Work involving handling of chemical substances	Dust respirator, gas mask, chemical-proof gloves. Chemical proof clothing, air-lined mask, eye protectors.
Wood working	Hard hat, eye protectors, hearing protection, safety footwear, leather gloves and dust respirator.
Blasting	Hard hat, eye and hearing protection.
Concrete and masonry work	Hard hat, eye protectors, hearing protection, safety footwear, leather gloves and dust respirator.
Excavation, heavy equipment, motor graders, and bulldozer operation	Hard hat, safety boots, gloves, hearing protection.
Quarries	Hard hat, eye protectors, hearing protection, safety footwear, leather gloves and dust respirator.

PROCEDURES TO DEAL WITH EMERGENCIES SUCH AS ACCIDENTS, SUDDEN ILLNESS AND DEATH OF WORKERS

First aid kits will be made available at all times throughout the entire construction period by the respective contractors. This is very important, because most work sites will be at some distance from the nearest hospital. In addition to the first aid kits, the following measures should be in place:

- i. Provision of dispensaries by the individual EPC contractor.
- ii. A vehicle shall be on standby from the Project Office so that emergency transportation can be arranged to take severely injured/sick workers to the nearest hospital for immediate medical attention.
- iii. A designated Health Officer/worker for the Project will be identified as a focal person to attend to all health and safety related issues. This employee's contact number will be posted at all work sites for speedy delivery of emergency services. The focal person shall be well versed with the medical system and facilities available at the hospital.
- iv. Communication arrangements, such a provision of radios or mobile communication for all work sites, for efficient handling of emergencies, will be made.

RECORD MAINTENANCE AND REMEDIAL ACTION

The Project Management will maintain a record of all accidents and injuries that occur at the work site. This work will be delegated by the contractor to the site supervisor and regularly reviewed every quarter by project management. Reports prepared by the contractor shall include information on the place, date and time of the incident, name of persons involved, cause of incident, witnesses present and their statements. Based on such reports, the management can jointly identify any unsafe conditions, acts or procedures and recommend

The suggested contents of Occupational Health and Safety Plan to be developed by the Contractor(s) are described below:

- i. Purpose
- ii. Scope of Application
- iii. Complying Basis
- iv. Occupational Health and Safety Objectives
- v. Organization and Responsibility
 - Contractor's Project Manager
 - HSE Management Department of the Contractor(s)
 - Medical Treatment Room of the Contractor(s)
 - Subcontractor's Project Manager
 - Subcontractor's HSE Managers
 - Occupational Health and Safety
 - Community Health and Safety
- vi. Health Plan
 - Labour Protection
 - Sanitary Epidemic Prevention
- vii. Safety Plan
 - Summary

ANNEX-VI

for the contractor to undertake certain mitigative actions to change any unsafe or harmful conditions.

COMPENSATION FOR INJURIES AND DEATH

Any casualty or injury resulting from occupational activities should be compensated as per the local labor laws of Pakistan. Where compensation is sought by the injured party, proper procedures for documentation of the case will be followed, including a detailed report on the accident, written reports from witnesses, report of the examining doctor and his/her recommendation for treatment. Each individual contractor will be responsible for ensuring compensation for the respective workers.

AWARENESS PROGRAMS

The Project management will undertake awareness programs through posters, talks, and meetings with the contractors to undertake the following activities:

- i. Dissemination sessions will clarify the rights and responsibilities of the workers regarding interactions with local people (including communicable disease risks, such as HIV/AIDS, COVID-19), work site health and safety, waste management (waste separation, recycling, and composting), and the illegality of poaching.
- ii. Make workers aware of procedures to be followed in case of emergencies such as informing the focal health person who in turn will arrange the necessary emergency transportation or treatment.

NOMINATION OF A HEALTH AND SAFETY FOCAL PERSON

Within each site (especially if different sites are being implemented by different contractors), a Health and Safety Focal Person will be appointed. The Terms of Reference (TOR) for the focal person will mainly be as follows:

- i. Function as the focal person/representative for all health and safety matters at the workplace;
- ii. Responsible for maintaining records of all accidents and all health and safety issues at each site, the number of accidents and its cause, actions taken and remedial measures undertaken in case of safety issues;
- iii. Be the link between the contractor and all workers and submit grievances of the workers to the contractor and instructions/directives on proper health care and safety from the contractors back to the workers;
- iv. Ensure that all workers are adequately informed on the requirement to use Personal Protective Equipment and its correct use;
- v. Also responsible for the first aid kit and making sure that the basic immediate medicines are readily available.

**ANNEX-VII: QUARRY
MANAGEMENT PLAN**

QUARRY MANAGEMENT PLAN

The contractor is responsible for extraction of resources for the construction aggregate from quarry area is required to prepare and implement a Quarry Management Plan (QMP). The overall objective of the QMP is to manage the extraction and processing of a valuable aggregate resource while avoiding, remedying or mitigating adverse effects on the environment and enhancing environmental performance wherever practicable.

The activities conducted in quarry areas are carried out under license or a mining lease under the Khyber Pakhtunkhwa Mining Concession, Rule 2005. The lease is issued based on open bidding. The lease is granted for a period not exceeding five years. The leased area may be re-auctioned within three months before its expiry but if the auction or the grant of lease is delayed due to the certain reason, the licensing authority may extend the period of previous lease upto the date of next grant.

The Licensing Authority of the Mines and Minerals Development Department Khyber Pakhtunkhwa shall inspect the lessee during the operation. If on inspection or otherwise, the licensing authority is of the opinion that lessee is working in a manner contrary to the conservation of mineral property or safety of workers and other people, the licensing Authority require the lessee, in writing, to remove the defects or amend the method of mining within the period, not exceeding two months, as is determined by the Licensing Authority. If the lessee fails to comply with the instruction within the specified period, the licensing authority shall have the power to stop the work of extraction of mineral in whole or in any part of the area demised under lease till such time that the defects are removed to the satisfaction of the Licensing Authority and if the defects are not removed or the method of mining are not amended to the satisfaction of the licensing authority within two months from the date of stoppage of work the lease shall be cancelled and bid money already paid shall be forfeited. Inspectorate of mines will ensure the safe mining practices, authorized mining and worker health and safety. KPEPA also plays vital role in environmental monitoring of the criteria pollutant at the Quarry area.

1. Key Quarry Activities

The Key activities identified in extraction of material from quarry are discussed as under:

i. Pre Operation

Pre Operation includes Land clearing and Overburden stripping

ii. Quarry Operation

Quarry Operation includes:

- Excavation of rock
- Loading and transportation of rock
- Crushing and stockpiling
- Asphalt manufacturing
- Water supply
- Transportation to the construction site.

ANNEX -VII

iii. Rehabilitation

- Reclamation activities are conducted after the completion of quarrying activities to restore or rehabilitate the site.

2. Environmental Considerations

Quarrying has the potential to have a range of adverse environmental effects. This QMP identifies these effects and suggests measures to mitigate or minimize these impacts.

i. Vegetation Removal

During land clearance and vegetation removal the following shall be considered:

- Minimize the amount of vegetation removal; and
- Allow timber and other useful resources to go to the local communities.

ii. Overburden Clearance

During overburden clearance the following shall be considered:

- No direct discharge of sediment laden water without treatment.
- Earthworks and land clearance should be minimized and phased.
- Provide treatment to achieve a reduction in suspended solids prior to discharge to a natural water course.
- Any discharges to rivers should occur during high flow to dilute the unavoidable discharges;
- Stockpiling should be at least 10m from a water course;
- Waste rock or overburden should be placed in properly designed dumpsites, which are located and shaped to blend in with the surrounding landscape;
- Compaction and re-vegetation of exposed areas as soon as practicable;
- Earthwork control measures should be inspected and maintained in efficient operating condition;
- Existing drainage channels should be kept free of overburden.
- Wherever possible, stripped topsoil should be placed directly onto an area being rehabilitated. This avoids stockpiling and double handling of the soil.

iii. Noise

To keep noise generated due to the different activities to an acceptable level, the following measures shall be adopted:

- Managing the time and location of particularly noisy operations around the site to ensure minimum disturbance to the localities;
- The majority of fixed processing plant, excluding conveyors will be housed within structures that reduce the noise level at the boundary of the quarry;
- Machinery shall be regularly maintained to ensure that noise produced from machinery is kept minimal; and
- Monitoring of noise levels shall be done.

iv. Excavation and Blasting

ANNEX -VII

To keep vibration and air overpressure due to excavation and blasting to an acceptable level, the following practices shall be adopted:

- Removing rock, where practicable, with an excavator by free digging or ripping instead of blasting.
- A comprehensive blasting management plan shall be prepared and implemented addressing the following concerns:
 - i. Control of blasting area
 - ii. Time schedule
 - iii. Training of personnel
 - iv. Announcement/ Communication
 - v. Traffic management
 - vi. Hazardous material handling and storage
 - vii. Waste disposal
 - viii. Post blast re entry
 - ix. Health and safety of worker

v. Traffic

To avoid, remedy or mitigate the adverse effects associated with quarry traffic following measures shall be adopted:

- All the vehicles used shall be regularly maintained and checked to ensure that appropriate noise suppression devices are installed and being operated effectively.
- All trucks leaving the quarry shall be checked for overloading to avoid risk of quarry products being spilled on public roads.
- Loader drivers shall be appropriately trained to help ensure that container/trucks are loaded securely.
- A wheel wash shall be used to spray truck wheels as they leave the quarry site. This will help reduce the risk of dust being carried onto public roads by trucks.
- To ensure the safety and convenience of local traffic, a Traffic Control Plan is required to be communicated that ensures minimized traffic stoppage times.

iv. Dust (Air quality)

Dust emissions have the greatest potential for off-site effects. However, provided the operation site is well controlled and the activities well managed, dust emissions can be reduced by adopting the following measures:

- Locating the fixed processing plant away from quarry boundaries;
- The fixed processing plant is covered in areas where dust generation could become a nuisance;
- Potential dust generating conveyors are covered where practicable to contain dust;
- Water sprays to suppress dust emissions wherever practicable;
- Blasting will be restricted if windy conditions are likely to carry visible dust emissions beyond the quarry boundary where they could create a nuisance;
- Minimizing dust emissions from blasting by sequential firing and using minimum force;
- Re-vegetating areas that will not be further disturbed as soon as possible;
- Proper maintenance and tuning of the vehicles and equipment also shall also be considered in avoiding any off-site effects; and

ANNEX -VII

- Good blasting practice, including using waterproof explosives in areas where groundwater levels are high, to avoid the degradation of the explosive, will minimize incomplete combustion and any associated NOx emissions.

vi. **Altering Water Flow**

Quarries and pits can affect ground-water and surface-water systems by lowering of local ground-water and surface-water levels from mining operations and mine dewatering, changes in turbidity levels in ground water due to blasting and quarry operations, interruption of ground-water conduit flow paths by rock removal and temperature change (thermal impacts) in springs and surface-water streams. To avoid reduced water flow from springs to water ways and irrigation/drinking water schemes, changes in water flow direction and increased storm water runoff, following mitigation measures shall be adopted:

- Create temporary ponds to treat sediment and reduce runoff speed of surface water flow especially during high rainfall.
- Create a channel from the settling ponds to the nearest river.
- Create a special water channel for citizens to source clean water from springs.
- Divert groundwater and surface water around the quarry area.

vii. **Landscape**

Following shall be considered in order to minimize impacts to the landscape;

- Vegetation and landscape plan for the site shall be devised and followed by the contractor that gives a comprehensive description of all measures that will be taken on site to protect the landscape and visual characteristics of the site;
- Provide earth mounding and vegetation screening to mitigate visual effects of quarry operations and on-site truck routes where practical.

viii. **Hazardous Substances**

To deal with issues relating to the release of hazardous substances from storage facilities or during their use, transport or disposal within the quarry site, the following shall be considered:

- Ensure that only the imminent operational requirements are stored on the site.
- Explosives and detonators shall not be stored for long time on site.
- Fuel, lubricant and waste oil storage, dispensing and operating facilities are designed and operated in such a way that contamination of soil and water is avoided as far as practicable.
- Rain runoff carrying fuel, lubricant and waste oil shall be directed to an oil separator before entering the storm water drainage system. Oil separators are cleaned out on a regular basis.
- All transport, storage and operating conditions meet the requirements of Khyber Pakhtunkhwa Environmental Protection Act, 2014 relevant sections of Handling of Hazardous Substances.

ix. **Rehabilitation of the site**

Restoration of the former quarry areas may be done using the overburden and fertilizers to restore soil stability and soil fertility.

- Remove all stockpiles.
- The use of imported fill shall be minimized.

ANNEX -VII

- Plant local plant species and productive vegetation as part of the restoration plan.
- Stabilize all slopes and unstable areas.

x. **Worker Health and Safety**

To ensure worker health and safety the following shall be adopted on or near the project site:

- Restrict the access to the quarry areas for unconcerned persons;
- All personnel shall be provided (and wear) Personal Protective Equipment (PPE), such as safety helmets, safety shoes, vests, dust masks, goggles, and a high visibility vest;
- Providing radio communications equipment to facilitate coordination in the field;
- Conducting periodic monitoring of heavy vehicles and equipment for safety risks;
- Limiting the hours of operation of heavy vehicles and equipment, to minimize risks relating to staff fatigue;
- Conduct inspections of the access point to the location of transport because of the steepness of the route;
- In case of accidents or emergencies, basic medical facility shall be provided;
- The team shall be able to handle emergency situations and the possible emergency services shall be notified in advance; and
- No damage occurs to people, property, livestock or power lines.

xi. **General Prohibitions**

The following General prohibitions shall be adopted in and around the quarry area:

- Cutting of trees for any reason outside the quarry;
- Hunting, fishing, wild capture and poaching, or plant collection;
- Buying of wild animals or their meat for food or any other purposes;
- Disturbance to anything with architectural or historical value;
- Use of firearms (except authorized security guards);
- Washing car or machinery in streams or creeks;
- Doing maintenance (change of oils and filters) of equipment outside authorized areas;
- Littering of the site and disposing trash in unauthorized places;
- Workers driving motorbikes without wearing helmets;
- Control construction plants or vehicles by unauthorized person;
- Driving at speeds exceeding limits;
- Having caged wild animals (especially birds) in camps;
- Working without safety equipment (including gloves, boots and masks);
- Creating nuisances and disturbances in or near communities;
- Disrespecting local customs and traditions;
- The use of welding equipment, oxy-acetylene torches and other bare flames where fires constitute a hazard;
- Indiscriminate disposal of rubbish or construction wastes or rubble;
- Spillage of potential pollutants, such as petroleum products;
- The storage and use of explosives;
- Collection of firewood; and
- Burning of wastes and/or cleared vegetation.

SANITATION PLAN

1. Introduction

This plan outlines the measures that can improve conditions of sanitation at construction sites during construction and operation phase.

2. Purpose of The Plan

The plan intends to ensure sanitation including the control of water supplies, excrete and wastewater disposal, refuse disposal, vectors of diseases, housing conditions, food supplies and handling, atmospheric conditions, and the safety of the working environment.

3. Management of Sanitation During Construction Phase

i) Responsibility

The Health and Safety Inspector designated by CC shall also inspect sanitation conditions and ensure safe working environment for workers.

ii) Location of Camp Sites

The construction camps shall be located at least 300-500 meter (subject to availability) away from residential community. The accommodation and ancillary facilities for labor shall be constructed and maintained to standards and scales approved by the Resident Engineer.

The camps must be located such that the drainage from and through the camps shall not endanger any domestic or public water supply.

All sites must be managed to avoid ditches and depressions to minimize nuisance due to stagnant water.

iii) Water Supply

An adequate and convenient water supply, approved by the appropriate health authority, must be provided in each camp for drinking, cooking, bathing and laundry purposes.

Potable water supply systems for labor camps occupants shall meet the drinking water quality standards of NEQS, 2016. In addition, the design of water system facilities shall be based on the suppliers Engineer's estimates of water demands. The drinking water must be monitored regularly for drinking water quality parameters.

At all construction camps and other workplaces, good and sufficient water supply shall be provided and maintained to eliminate chances of waterborne diseases to ensure the health and hygiene of the workers.

ANNEX-VIII

iv) Toilet Facilities and Hygiene

According to health and safety guidelines OR-OSHA number of toilets required at construction site is as one toilet for 20 workers.

Within the premises of every workplace, toilets and urinals shall be provided in an accessible place, and the accommodation, separately for each of these, as per standards prevailing in the province and country.

Toilet facilities adequate for the capacity of the camp must be provided. Each toilet room must be located, so as to be accessible.

A toilet room must be located within 200 feet of the camp. No toilet may be closer than 100 feet to kitchen and sleeping area.

These toilets must be distinctly marked by signs printed in native language of the persons occupying the camp, or marked with easily understood pictures or symbols.

Urinals troughs in privies must drain freely into the pit or vault, and the construction of this drain must be such as to exclude flies and rodents from the pit.

Proper facility for hand washing and other cleaning activities to be provided as follows:

- Provide individual hand towels from a sanitary dispenser and receptacles for disposing of waste towels;
- Providing hand soap and industrial hand cleaner for removing paints and other contaminants;
- Prohibited use of gasoline or solvent for hand washing; and
- Keep the floor of facilities dry to prevent spills and falls.

v) Waste Disposal

The sewage system for the camp must be designed, built and operated in compliance with the relevant legislation so that no health hazard occurs and no pollution to the air, ground or adjacent watercourse takes place.

Garbage bins must be provided in the camps and regularly emptied and the garbage disposed of in a hygienic manner.

Unless otherwise arranged for by the local sanitary authority, arrangement for disposal of excreta should be done in the already existing sewerage system in the area.

On completion of the works, all such temporary structures shall be cleared away, all rubbish burnt, excreta tank and other disposal pits or trenches filled in and effectively sealed off and the outline site left clean and tidy, at the Contractor's expense, to the entire satisfaction of the engineer.

ANNEX-VIII

vi) Maintenance of Sanitary Facility

Proper maintenance of toilets and other sanitary facilities should assure by health and safety inspector. Toilets and other sanitary facilities shall be cleaned at least four times daily and at least twice during working hours and kept in a strict sanitary condition. Receptacles shall be tarred inside and outside at least once a year.

All buildings, rooms and equipment and the grounds surrounding them shall be maintained in a clean and operable condition, and be protected from rubbish accumulation.

All necessary means shall be employed to eliminate and control any infestations of insects and rodents within all parts of any labor camp.

4. Management of Sanitation During Operational Phase:

A proper sanitation plan is to be adopted for maintaining the hygienic conditions during the operational phase of the project. These includes

- Site Clearance;
- Sewage and Storm Water Drainage Clearing, and
- Solid Waste Management.

i) Site Clearance

The CC shall assure the clearance of construction machinery, vehicle and other equipment used during the construction period after the completion of the project.

ii) Storm Water and Sewage Clearance

One of the main issue that may arise during construction and operational phase is the clogging of drainage and sewer pipelines as a result of construction material, oil spillage from vehicles, and throwing of solid waste by the road users due to lack of bins into the nearby drainage and sewer pipes, as the blockage of these drainage pipes will cause over flow of water on road, which will have negative impacts on the road in form of deterioration of road surface as well as a source of water borne diseases in the area.

Responsible Authorities

In case of storm water drains and sewer pipes clogging, the concerned department PMU-NHA is responsible for un-clogging of these sewer and drainage pipelines.

iii) Solid Waste Management

Municipal solid waste produced as a result of commercial activities, by road users and from nearby residential community should be collected and managed properly by the concerned department. Waste bins should be placed along the roads, regular cleaning of the road should

ANNEX-VIII

be carried out using mechanical sweepers twice a day and at least one sweeper should be deputed for the whole stretch of project site to assure regular cleaning.

iv) Awareness and Training

A training and awareness sessions shall be conducted for workers before commencement of the project. The implementation of sanitation plan would be more effective if the importance of hygiene; sanitation and safety are known to the workers.

**ANNEX-IX CHANCE FIND
PROCEDURE**

ANNEX-IX

CHANCE FIND PROCEDURES

Project may involve deep excavation. Therefore, the possibility of chance find is not ignorable. In case of any chance find, the contractor will immediately report through SC to Director Archaeology & Museum, Government of Khyber Pakhtunkhwa to take further suitable action to preserve those antique or sensitive remains. Representative of the DG will visit the site and observed the significance of the antique, artifact and cultural (religious) properties and significance of the project. The report will be prepared by representative and will be given to the DG. The documentation will be completed and if required suitable action will be taken to preserve those antiques and sensitive remains.

In case any artifact, antiques and sensitive remains are discovered, chance find procedures should be adopted by contractor workers as follows:

- Stop the construction activities in the areas of chance find;
- Delineate the discovered site or area;
- Consult with the local community and provincial Archeological Department
- The suggestion of the local communities and the concerned authorities will be suitably incorporated during taking the preventive measures to conserve the antique, artifact and cultural (religious) properties;
- Secure the site to prevent any damage or loss of removable objects. In case of removable antiquities or sensitive remain, a night guard shall be arranged until the responsible local authorities take over; and
- After stopping work, the contractor must immediately report the discovery to the Supervision Engineer.

The contact Address of Directorate General of Antiquities, Government of Khyber Pakhtunkhwa , is given below:

Directorate of Archaeology and Museums,
Jail Road, adjacent to Archives and libraries department,
Finance Department, Civil Secretariat,
Peshawar, Khyber Pakhtunkhwa
Tel: (091) 9211194

**ANNEX-X EMERGENCY RESPONSE
PLAN**

ANNEX-X

GUIDELINE EMERGENCY PREPAREDNESS AND RESPONSE PLAN

PURPOSE

The purpose of this Emergency Response Procedure is to provide measures and guidance for the establishment and implementation of emergency preparedness plans for the project. The aim of the Emergency Response Procedure is to:

- i. Ensure all personnel and visitors to the office/job sites are given the maximum protection from unforeseen events.
- ii. Ensure all personnel are aware of the importance of this procedure to protection of life and property.

EMERGENCY PREPARATION AND RESPONSE MEASURE SCOPE

The emergency management program is applied to all Project elements and intended for use throughout the Project life cycle. The following are some emergencies that may require coordinated response.

- i. Construction Accident
- ii. Road & Traffic Accident
- iii. Hazardous material spills
- iv. Structure collapse or failure
- v. Trauma or serious illness
- vi. Sabotage
- vii. Fire
- viii. Environmental Pollution
- ix. Loss of person
- x. Community Accident

RESPONSIBILITIES

The detailed roles and responsibilities of certain key members of the Emergency Response team available to assist in emergency are provided in Table 1 below.

Table 1: Emergency Response Team

Action Group	Responsibility
Emergency Coordinator	<ul style="list-style-type: none">▪ Overall control of personnel and resources.▪ The Emergency Coordinator will support and advise the Site Safety Supervision as necessary.▪ Serves as public relations spokes persons, or delegates to some staff member the responsibility for working with news media regarding any disaster or emergency. Also assure proper coordination of news release with appropriate corporate staff or other designated people.
Site Safety Supervision (Emergency Commander)	<ul style="list-style-type: none">▪ Overall responsibility for activating emergency plan and for terminating emergency actions.▪ Be alternative of emergency response chairpersons.▪ Disseminates warnings and information as required to ensure all people in the immediate area have been warned and evacuated either by alarms or by word of mouth.

ANNEX-X

	<ul style="list-style-type: none"> ▪ Supervise the actions of the Emergency Response Team to ensure all persons are safe from the danger. ▪ Notify outside authorities if assistance is required. ▪ Carries the responsibility for coordinating actions including other organizations in accordance with the needs of the situation. ▪ Ensure maximum co-operation and assistance is provided to any outside groups called to respond to an emergency. ▪ Establish and appoint all emergency organization structure and team. ▪ Assures adequate delegation of responsibilities for all key positions of assistants on the Project to assist with any foreseeable emergency. ▪ Ensure resources available to purchase needed emergency response equipment and supplies. ▪ Assures that all persons on the Emergency Response Team aware and fully understand their individual responsibilities for implementing and supporting the emergency plan. ▪ Establish the emergency drill schedule of all identified emergency scenarios, track the status and evaluate the emergency. ▪ The Emergency Commander shall ensure that senior management personnel have been reported of the emergency as soon as practical after the event.
Security Team	<ul style="list-style-type: none"> ▪ Ensure that the exit route is regularly tested and maintained in good working order. ▪ Maintain station at the security gate or most suitable location to secure the area during any emergency such that only authorized personnel and equipment may enter, prevent access to the site of unauthorized personnel. ▪ Assist with strong/activation of services during an emergency. ▪ Ensure vehicles and obstructions are moved to give incoming emergency vehicles access to the scene, if ambulance or emergency services are attending the site, ensure clear access and personnel are located to direct any incoming emergency service to the site of emergency.
Rescue & Medical Team	<ul style="list-style-type: none"> ▪ Protect the injured from further danger and weather. ▪ Provide treatment to the victim(s) to the best of their ability by first aid and then transfer to hospital. ▪ Remain familiar with the rescue activities and rescue apparatus. ▪ Assist outside medical services personnel when they arrive
General Administration Team	Response to support any requested general facilities for assisting Emergency Response Team in their work.
Government Relation Team	<ul style="list-style-type: none"> ▪ Coordinate with local government on a matter of concerned in the emergency response plan to liaise with local officers in their affair for support Emergency Response Team. ▪ Coordinate emergency plan with the government authorities, local community.
Environment Team	In case of emergency related to the environmental pollution such as the chemical spill, oil spill into the ambient, the environment team will support the technical advice to control and mitigate the pollution until return to the normal situation.
Department Heads	<ul style="list-style-type: none"> ▪ Call up of personnel into the safe location for protective life and property. ▪ Take immediate and appropriate action while Emergency Response Team is being mobilized. ▪ Keep in touch with the Emergency Commander ▪ Control and supervise operators and contractors on the implementation of this procedure, with consultation with Safety Team as necessary. ▪ Provide and maintain emergency equipment of their responsible areas.
Other Staff and Employees	<ul style="list-style-type: none"> ▪ All other staff and employees will remain at their workstations or assembly point unless directed otherwise from Emergency Response Team.

ANNEX-X

	▪ Each supervisor will ensure that all members of his work group are accounted for and keep in touch with each of their Department Head.
--	--

PROCEDURE

Emergency situation and injuries to person can occur at any time or place either on Project site or elsewhere. The most two common types of emergencies on site are fire and serious accident.

Figure 1: Emergency Procedures for Fire

FIRE	
RESCUE	• Rescue any person in immediate danger if safe to do so
ALARM	• Raise the alarm by shouting to raise attention to others • If confident and safe to do so, commence fighting the fire
EVACUATE	• If not practical to fight the fire, move to safe area ensuring all other personnel are warned along the way
REPORT	• Advise the Emergency coordinator of the reasons for the alarm and location of fire.

Figure 2: Emergency Procedures for Serious Accident

ACCIDENT

In the event of injuries of persons, the first person on the scene should take the following action:

If a hazard exists consider your own safety then if possible remove the hazard or the injured person.

Assess the patient by checking for Airway, Breathing, Pulse and obvious

Report directly to First Aid or Security Centers, when raising the alarm you must clearly give the following information;

- Your name and the detail of accident
- The location of the injured person(s)
- The number of persons injured
- The extent of the injuries, if known
- What known hazards are in the area

Make the injured person as comfortable as possible

Treat the obvious injuries

Reassure the injured person

COMMUNICATION WITH AUTHORITIES / PRESS AT SITE

In the event of an accident or incident, only senior staff is permitted to give factual information to the authorities for resource of liability exposure. The press must be avoided politely, at all costs, with the terse comment that "the matter is under investigation and relevant information when available will be provided by our Head Office" Do not ever give your opinion or story.

FIRST AID PERSONS

Upon advice of medical emergency, make immediate assessment to response required and if necessary, advise security to summon ambulance or medical assistance, the qualified first aid attendant should also,

- Provide treatment to the victim(s) to the best of his/her ability.
- Ensure the safety of victims by ceasing any work activity in the area.
- Protect the injured from further danger and weather.
- Assist medical services personnel when they arrive.

GENERAL ADMINISTRATION TEAM

ANNEX-X

Upon advice of medical emergency, maintain contact with first aid personnel and summon ambulance if required.

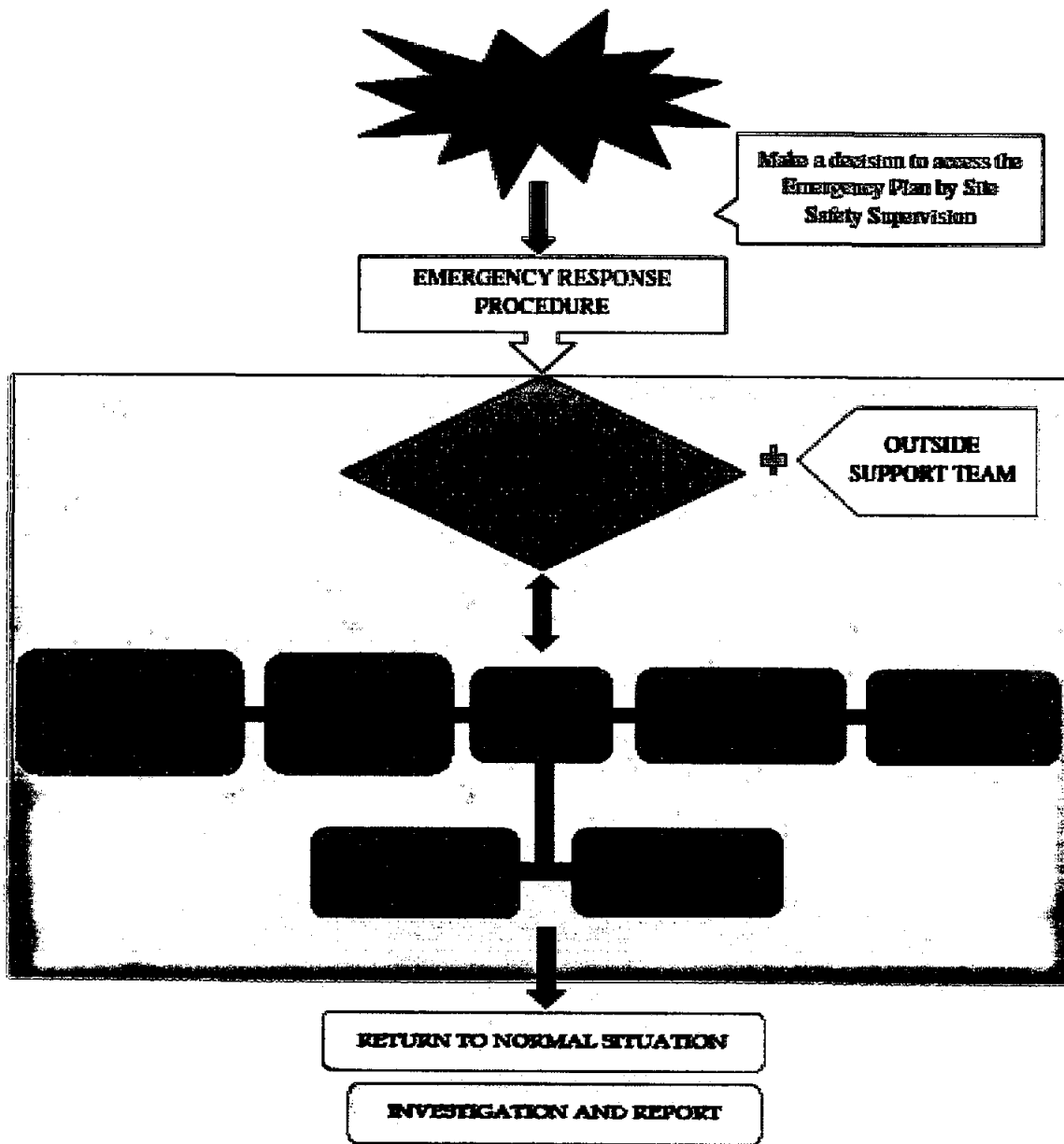
SECURITY TEAM

- If ambulance or emergency services are attending the site, ensure clear access and personnel are located to direct vehicle closest to the scene.
- Prevent access to the site of unauthorized personnel (press, etc.).

EMERGENCY COORDINATOR

- The Emergency Coordinator shall assist emergency personnel at the scene as required through allocation of company resources.
- The Emergency Coordinator shall ensure next-of-kin are properly notified as soon as possible and give whatever company support and assistance is necessary to assist them bundle the situation
- The Emergency Coordinator shall ensure that senior management personnel are advised of the emergency as soon as practical after the event.

ANNEX-X



Note: Name of contact person and call number from Owner/Contractor to be determined.

ANNEX-X

INCIDENT AND ACCIDENT REPORT

Section A: Identification Data						
Report No:	Date of Report:			Reporter:	Sign:	
Job Title:				Company Name:		
Section B: Violence Rate						
Accident Violence: <input type="checkbox"/> 01- Death <input type="checkbox"/> 02- Serious Injury <input type="checkbox"/> 03- Lost Time Injury <input type="checkbox"/> 04- First Aid <input type="checkbox"/> 05- Not Injury <input type="checkbox"/> 06- Near Miss Property Damage Cost: <input type="checkbox"/> 1-2,000 USD <input type="checkbox"/> 2,001-10,000 USD <input type="checkbox"/> 10,001-50,000 <input type="checkbox"/> > 50,001						
Section C: Environmental Impact						
Affected area	<input type="checkbox"/> Construction area	<input type="checkbox"/> Public area				
Receptor	<input type="checkbox"/> Non-	<input type="checkbox"/> Workers		<input type="checkbox"/> Community		
Type of pollution	<input type="checkbox"/> Physical	<input type="checkbox"/> Chemical		<input type="checkbox"/> Biological		
Toxicity	<input type="checkbox"/> Non-toxic	<input type="checkbox"/> Low-toxic		<input type="checkbox"/> High-toxic		
Returns to Normal	<input type="checkbox"/> 1 day	<input type="checkbox"/> 1 day to 1 week		<input type="checkbox"/> > 1 week		
Cumulative impact	<input type="checkbox"/> Non-cumulative		<input type="checkbox"/> Cumulative			
Section D: Injured/Illness Employee						
I. Name:		Sex:	Date of Birth:		Age:	Regular Job Title:
		<input type="checkbox"/> Male <input type="checkbox"/> Female	Month:	Day:	Year:	
						Experience: In this job title: In this Project Years Weeks Years Weeks
Site:	Company:		Reference:		Phone No:	Social Security Number:
Part of Body Injured or Affected:			Nature of Injury or Illness:			
<input type="checkbox"/> Head	<input type="checkbox"/> Hands	<input type="checkbox"/> Face	<input type="checkbox"/> Nose	<input type="checkbox"/> Laceration	<input type="checkbox"/> Amputation	<input type="checkbox"/> Puncture
<input type="checkbox"/> Eyes	<input type="checkbox"/> Legs	<input type="checkbox"/> Teeth	<input type="checkbox"/> Neck	<input type="checkbox"/> Strain & Sprain	<input type="checkbox"/> Burns	<input type="checkbox"/> Contusion
<input type="checkbox"/> Throat	<input type="checkbox"/> Feet	<input type="checkbox"/> Elbow	<input type="checkbox"/> Shoulder	<input type="checkbox"/> Hernia	<input type="checkbox"/> Foreign Body	<input type="checkbox"/> Chemical
<input type="checkbox"/> Back	<input type="checkbox"/> Ankle	<input type="checkbox"/> Wrist	<input type="checkbox"/> Foot	<input type="checkbox"/> Skin (Cuts/abrasions)	<input type="checkbox"/> Rash	<input type="checkbox"/> Irritation
<input type="checkbox"/> Arms	<input type="checkbox"/> Thump	<input type="checkbox"/> Fingers	<input type="checkbox"/> Internal	Remark:		
II. Name:		Sex:	Date of Birth:		Age:	Regular Job Title:
		<input type="checkbox"/> Male <input type="checkbox"/> Female	Month:	Day:	Year:	
						Experience: In this job title: In this Project Years Weeks Years Weeks
Site:	Company:		Reference:		Phone No:	Social Security Number:
Part of Body Injured or Affected:			Nature of Injury or Illness:			
<input type="checkbox"/> Head	<input type="checkbox"/> Hands	<input type="checkbox"/> Face	<input type="checkbox"/> Nose	<input type="checkbox"/> Laceration	<input type="checkbox"/> Amputation	<input type="checkbox"/> Puncture
<input type="checkbox"/> Eyes	<input type="checkbox"/> Legs	<input type="checkbox"/> Teeth	<input type="checkbox"/> Neck	<input type="checkbox"/> Strain & Sprain	<input type="checkbox"/> Burns	<input type="checkbox"/> Contusion
<input type="checkbox"/> Throat	<input type="checkbox"/> Feet	<input type="checkbox"/> Elbow	<input type="checkbox"/> Shoulder	<input type="checkbox"/> Hernia	<input type="checkbox"/> Foreign Body	<input type="checkbox"/> Chemical
<input type="checkbox"/> Back	<input type="checkbox"/> Ankle	<input type="checkbox"/> Wrist	<input type="checkbox"/> Foot	<input type="checkbox"/> Skin (Cuts/abrasions)	<input type="checkbox"/> Rash	<input type="checkbox"/> Irritation
<input type="checkbox"/> Arms	<input type="checkbox"/> Thump	<input type="checkbox"/> Fingers	<input type="checkbox"/> Internal	Remark:		
Section E: Accident/Incident Details						
Date Accident/Incident Occurred:			Time Accident/Incident Occurred:			Exact Location of the Accident / Incident:

ANNEX-X

Details of the actual job being done at the time:		
Details of Accident / Incident (What actually happened?)		
Section F: Accident Cause (Mark cause with X / Contributing cause, if any mark C)		
LINSAF CONDITIONS	LINSAF ACTS	
1 Inadequately Guarded	1	Operating Without Authority / Tampering
2 Unguarded	2	Operating at Unsafe Speed
3 Defective Tools, Equipment, or substances	3	Making Safe Device Inoperative
4 Unsafe Design or Construction	4	Using Unsafe Equipment or Equipment Unwisely
5 Hazardous Arrangement	5	Unsafe Loading, Placing, Moving
6 Unsafe Illumination	6	Using Unsafe Position
7 Unsafe Ventilation	7	Working on Moving or Dangerous Equipment
8 Unsafe Clothing	8	Distraction, Teasing, Horse Play
9 Insufficient Instruction	9	Failure to use Personal Protective Devices
10 Lack of system of work	10	Lack of adequate instruction or supervision
Why was the unsafe act committed?	Why did the unsafe condition exist?	
Section G: Guide to Corrective Action (Base on the causes checked above, I am taking the following corrective action)		
LINSAF ACT	LINSAF CONDITION	If Supervisor can't handle, then recommend to
Stop the behaviour	Remove	Site Engineer, or
study the job	Guard	Site Manager, or
Instruct (tell-show-try-check)	Warn	Project Manager, or
Follow Up	Supervisory Training	Safety Committee
Enforce		
Detail below any immediate remedial actions that have been taken:		
Detail below any corrective and preventative actions that could be taken to prevent future re-occurrence	Responsible	Completion Date

ANNEX-X

Section II: Witness Statement			
Witness Name		Interviewer Name	
Section III: Reviewed & Recommended by			
Recommendation:			
Reviewed By:	Position:	Signature:	Date:
<p>Remarks : If Accident or Incident happened with lost time injury and affected to the publicly must further report to Safety Department.</p> <p>: First Aid Cases will not applicable to this form.</p> <p>: The accident report shall submit to Safety Department within 3 days.</p> <p>: Attached the photograph or sketch the location of accident / incident.</p>			

SUGGESTED CONTENTS OF EPRP

The Contractor should prepare the EPRP based on the guidelines provided in the above sections. The suggested structure of the EPRP is listed below:

1. Purpose
2. Applicable Scope
3. Preparation Basis
4. Emergency Response System
 - 4.1 Generals
 - 4.2 Emergency Response System
 - 4.3 Responsibilities
5. Major Safety Risks
6. Precautionary Measures
 - 6.1 Training and Exercise
 - 6.2 Hazard Source Monitor
 - 6.3 Alert Action
 - 6.4 Management Measures
7. Control Measures
 - 7.1 Response
 - 7.2 Response Procedures
 - 7.3 Emergency Response
 - 7.4 Emergency Completion and Restoration
8. Emergency Response Report and Settlement
9. Supporting Measures

ANNEX-X

- 9.1 Communication
- 9.2 Emergency Team
- 9.3 Funding for Emergency
- 9.4 Provisions and Resources
- 10. Records

**ANNEX-XI: GUIDELINES TO
COMBAT WITH COVID-19**

PRECAUTIONARY ACTION AGAINST THE POTENTIAL RISK OF NOVEL CORONAVIRUS

INTRODUCTION

On February 11, 2020 the World Health Organization announced an official name for the disease that is causing the 2019 novel coronavirus outbreak, first identified in Wuhan China. The new name of this is COVID-19, abbreviated as COVID-19. In COVID-19, 'CO' stands for 'corona,' 'VI' for 'virus,' and 'D' for disease. Formerly, this disease was referred to as "2019 novel coronavirus" or "2019-nCoV".

Coronaviruses are a large family of viruses. Some cause illness in people, and others, such as canine and feline coronaviruses, only infect animals. Rarely, animal coronaviruses that infect animals have emerged to infect people and can spread between people. This is suspected to have occurred for the virus that causes COVID-19. Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS) are two other examples of coronaviruses that originated from animals and then spread to people.

The risk of exposure to COVID-19 is no different for employees of Employer, Engineer, Contractor, and suppliers than for the general population. Contractor, therefore, must consider the physical well-being and safety of all the persons entitled to be on the Site and follow reasonable guidelines and recommendations of Government authorities and healthcare professionals. As experience has shown in other countries, confirmed cases of COVID-19 expand exponentially if health and safety controls are left unheeded.

Contractor should enforce all health and safety procedures at Site including sanitary protocols, proper hygiene, social distancing, use of personal protective equipment (PPE), toolbox talks on special COVID-19 requirements, and prompt reporting of health issues related to COVID-19. Contractors must put safeguards in place to keep workers exposed to COVID-19 away from Site for at least 14 days after the last potential exposure.

WHO declared the COVID-19 as a Public Health Emergency of International Concern (PHEIC) in January 2020 and afterwards announced the COVID-19 outbreak as pandemic on 11th March 2020 due to the widespread of the disease in 114 countries at that time. WHO Director General urged the countries to take action now to stop the disease.

The rapid spread of COVID-19 hits all the provinces of Pakistan Sindh, Balochistan, Punjab & Khyber Pakhtunkhwa including the Gilgit Baltistan and Azad Jammu & Kashmir. The prevailing virus creates the menacing and distressing situation when it arrived around the closed proximities of the Project Area.

Government of Pakistan has launched the National Action Plan for COVID-19 Pakistan to combat the challenge of prevailing virus, also available at <https://www.nih.org.pk/wp-content/uploads/2020/03/COVID-19-NAP-V2-13-March-2020.pdf>. The Government of Pakistan has launched the real-time data portal for COVID-19 <http://covid.gov.pk/>. These measures are mostly relating to the containment and awareness and capacity building.

ANNEX-XI

Besides this COVID-19 daily situation report is also available at <https://www.nih.org.pk/wp-content/uploads/2020/04/COVID-19-Daily-Updated-SitRep-03-April-2020.pdf>.

All the stakeholders are on board to jointly prevent/ limit/ control the spread of COVID-19. All of the staff is required to take precautionary measures as well as maintain social distances. The use of thermal guns for checking every single person body temperature, placement of relevant flyers and disinfection spray inside of all the containers are few of the measures to combat COVID-19.

OBJECTIVE

Following are the objectives of this report to jointly prevent / limit/ control the spread of COVID-19 at Site that can hamper the progress of proposed Project:

- i. To enhance understanding of the evolving COVID-19;
- ii. To share knowledge on COVID-19 and preparedness measures being implemented at Site;
- iii. To generate recommendations for adjusting COVID-19 containment and response measures; and
- iv. Outline the measures taken at Site. The advised measures will help all the stakeholders to plan their work continuity in response to the COVID-19.

Due to the evolving situation of the COVID-19, this document should be read in conjunction with the latest relevant advisories issued by WHO (especially "[Getting your workplace ready for COVID-19, 3 March 2020](#)") and Government of Pakistan.

WHAT IS CORONA VIRUS (COVID-19)

The COVID-19 belongs to a family of viruses known as the Coronaviruses, which can cause illnesses ranging from the common cold to more severe diseases, such as the Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS)¹³.

SYMPTOMS

The symptoms of the COVID-19 are similar to that of regular pneumonia. Typical symptoms include;

- o Fever;
- Cough;
- Difficulty in breathing;
- Pneumonia;
- Runny nose;
- Sore throat; and
- Feeling of being unwell.

¹³ Source: World Health Organization

ANNEX-XI

MODE OF SPREAD

Infected person – person transmission; Infected people can spread COVID-19 through their respiratory secretions via droplets produced when an infected person coughs or sneezes, similar to how influenza and other respiratory pathogens spread. The spread from person-to-person is most likely among close contacts (about 6 feet);

- Infected animals' dead or Alive;
- Air by coughing and sneezing;
- Close personal contact, such as touching or shaking hands;
- Touching an object or surface with a virus on it; and
- Touching your mouth nose or eyes before washing your hands.

GENERAL STANDARDIZED PRECAUTIONARY MEASURES

Following measures/recommendations are suggested as a general guidance to be followed for the protection of potential impacts of COVID-19:

Since, there is no vaccine available to protect against human Coronavirus infections. Therefore, transmission can be prevented through following measures:

- Cover your mouth while cough or sneeze;
- Avoid close contact with people who are sick;
- Avoid the use of hard soap;
- Wash your hands often with liquid soap and water for at least 20 seconds;
- All the employees should ensure sanitization of hands at appropriate time;
- Avoid touching your eyes, nose, and mouth with unwashed hands;
- If you are concerned about your symptoms you should see your health care provider at site or in office;
- Use of Personal Protective Equipment (PPE) according to risk (a surgical or N95 mask);
- Do not spit, wrap your oral and nasal secretion with tissue and throw it in a covered dustbin;
- Balance your nutrition and exercise moderately;
- Sterilization / disinfection of medical devices at Site dispensaries; and
- Do not touch, buy or eat wild animals (gamey). Try to avoid visiting markets that sell such animals.

PROJECT SITE SPECIFIC PRECAUTIONARY MEASURES

Measures for protecting staff and labour from exposure to, and infection with, the COVID-19 depend on the type of work being performed and exposure risk, including potential for interaction with infectious people and contamination of the work environment. Regardless of specific exposure risks, following are the main actions that have been jointly taken at Site to combat the COVID-19:

ANNEX-XI

Employer's Side

Employer should issue the notification containing the precautionary measures in the light of Government of Khyber Pakhtunkhwa guidelines to be implemented at Site. Upon receiving the Employer notification all the mentioned precautionary measures will be communicated to Engineer staff for compliance. Employer technical staff is also complying with the Government of Khyber Pakhtunkhwa guidelines and Contractor suggestion to control the spread of COVID-19 at Site in the best interest of the Project and country.

Consultant's Side

Consultant's top management will issue the orders in the light of Government of Khyber Pakhtunkhwa guidelines containing the precautionary measures to control the spread of COVID-19 for the staff working at Site.

Consultant staff at Site will fully complying with the orders including photographic evidence. Considering the severity of the prevailing virus Engineer devised the Standard Operating Procedure (SOP) containing precautionary action against the potential risk of novel corona virus.

Besides, above Consultant will ensure the following precautionary measures at Site.

- Adequate signage and information at all entrances and exits showing what is Corona Virus, how it spreads, what are the symptoms, standard precautions;
- The awareness session for the Contractor staff is equally important as of Consultant staff to combat the COVID-19 at Site. The Consultant will ensuring that Contractor is arranging such session at Site from time to time to reduce the potential risk of COVID-19. Further, all the newly inducted and existing staff have been given HSE training by the Consultant & Contractor.

Contractor's Side

Contractor will communicate various precautionary measures to Employer and Engineer through letters to control the spread of COVID-19 at Site. Following are the major steps to be taken by the Contractor:

- Contractor will convey the instructions and requirements of its superior unit for the prevention and control of COVID-19 epidemic at Site.
- Contractor will establish a special organization for epidemic prevention and control on the Project Site that is responsible for arranging, implementing, publicizing and supervising the epidemic prevention and control measures.
- Launch the plan for epidemic prevention and control on the project Site that includes:
 - All personnel in temporary camp are required to wear masks;
 - Contractor personnel incharge of Site to wear masks;
 - Arranged special personnel to measure and record the temperature of all personnel when entering or leaving the temporary camp;

ANNEX-XI

- If any person with fever, cold and other symptoms are found, they will be admonished to go home for isolation and asked about the development of the disease every day; and
- Propagate and implement the epidemic prevention measures for the staffs and labours and warn them not to go outside and home as much as possible.
- All these meetings should be carried out through video conference.

Contractor is not limited to the above precautionary measures but practicing and implementing the following;

- Contractor will prepare a pamphlet for the awareness of Site staff to combat the COVID-19. It will also be placed/posted at strategic points at Site.
- Launch awareness campaign to inform all the staff and labour about the coronavirus, to use facemask, hand hygiene, cough etiquette, and avoidance of close contact with animals and consumption of their raw products.
- Everyday awareness speech in English and Urdu in the temporary camp.
- All the employees are not allowed to go outside of the Project Area or on vacation to their homes and on daily basis visit to sites;
- Contractor will provide medical masks and antibacterial liquid hand wash to all personnel.
- Contractor will prepare the isolation facility at Site and provide three isolated rooms for such patients inside the temporary camp. Each room has three beds, oxygen cylinder, sanitizers, isolation kit, hand wash.
- Thermal scanning will be carried out continuously in the morning for everybody at the main gate of temporary camp.
- Record will be maintained for everyone that includes the temperature value of each person with their names, every morning and afternoon go to each department for scanning separately and noted down their name with temperature values.
- Contractor carry out disinfectant spray on daily basis morning and afternoon in each office and rooms and all the area of the camp.
- Avoid interaction with the Proponent and the Consultant staff physically rather through electronically by emails or video conferencing.

RECOMMENDATIONS FOR THE CONTROL OF COVID-19 AT SITE

To Avoid Transmission

For all personnel at Site, it is always a good to practice the following precautionary measures:

- Workers to remain at least two meters apart from each other at all times (social distancing) – i.e. spread out and reduce the number of people working together in one area of the site;
- Avoid eating lunch in the form of group in available mess/canteens at Site;
- Close site canteens/ food preparation and eating areas (avoid gatherings) – workers to bring their own prepared lunch to site and eat alone e.g. in their van, car, or in an open space;

ANNEX-XI

- Avoid in-person meetings if possible. In the case that an in-person meeting is unavoidable, make sure to have it in a well-ventilated area with sufficient space for attendees to distance themselves from one another. For meetings such as toolbox talks, consider breaking them up into smaller group meetings versus one large meeting;
- Introduce enhanced cleaning procedures across the Site and touch points e.g. office equipment, plant and machinery controls, taps/toilet/washing facilities, handrails;
- Stagger start times on site to avoid congestion in entrance areas;
- Reduce the number of people on site inductions at any one time and hold them outdoors if possible;
- Stop workers moving across various sites (potential for cross contamination);
- No outsiders should be at the Project Site;
- Contractor, Consultant and Employer personnel are advised to avoid travelling and in case traveling is unavoidable, prior approval from the management should be essential. In case of travelling, the above mentioned measures need to be strictly followed by the traveller;
- Prompt identification and isolation of potentially infectious individuals is a critical first step in protecting workers and other Site staff. An isolated area should be available at Site to immediately isolate suspected person, as it is most important to stop its spread at Site.
- Rapid Response Team should be formed and be informed immediately in case of suspect and confirmed case of COVID-19.
- Medical team at Site should separate the suspected person displaying fever, cough or difficulty breathing from other personnel; and
- If a person has had close contact with an individual that has confirmed COVID-19, that person will not be allowed to return to the Site until he/she has been symptom free for 14 days.
- Clean and fumigate all the workplaces at Site on daily basis;
- Ask people to stay at home if they have fever, cough, difficulty in breathing, runny nose, sore throat as per organizational rules;
- An immediate replacement of solid soap with liquid anti-bacterial soap bottles may be appropriate.
- Provision of alcohol-based hand sanitizer need to available for all staff;
- Clean the religious places carpets and rugs. Have them washed in place over the weekend and then do regular cleaning;
- Have the cleaners/ maintenance crews regularly clean surfaces that are touched frequently by personnel with disinfectants such as in and out doors;
- Fresh medical tests of staff working should be carried out at Site;
- Dispose of all contaminated waste (gloves, paper, swab handles, etc.) into biohazard waste bags for disposal;
- Ensure that panic is not created. In fact the posters should start with statements such as do not panic and fear the virus but know and prevent; and
- Ensure proper ventilation system for all the personnel at Site.

Use of Personal Protective Equipment (PPEs)

ANNEX-XI

- Necessary PPE should be available at Site all the times and are being issued to each personnel at Site;
- Practice of using masks is also being ensured by all parties at Site (a surgical or N95 masks);
- Re-usable PPE should be thoroughly cleaned after use and not shared between workers. Single use PPE should be disposed of so that it cannot be reused;

Outside Visitors

- Visitors should enter with strictly wearing visitors card;
- Ensure sanitization of hands;
- All parties should ensure that the sick persons should be wearing a surgical or N95 masks;
- Note down the complete information of outsiders before entrance;
- Proper screening should be carried out before entering the Site;
- Refrain from handshakes. Rather than shaking hands, visitors may explain why handshakes can contribute to the risk of spread;
- Attempt to maintain a general six (6) feet distance between themselves. This will be challenging to follow at all times but it is Engineer recommendation to follow;
- Refrain from and/or limit touching of workplace surfaces; and
- In addition to these on-site procedures, it is advised to follow their respective organizational instructions related to Site visits.

**ANNEX-XII: TREE PLANTATION
PLAN**

ANNEX-XII

TREE PLANTATION/ AFFORESTATION PLAN

PLANTATION PLAN

The basic purpose of afforestation/plantation of suitable species in the project area is to reduce the risk been made due to different construction activities for the proposed Project. The expected risk made will be compensated by planting of saplings to enhance green cover and improve the overall environment of the area. Afforestation will not only reduce the risk been made but will also increase the Green cover, carrying capacity and aesthetics of the area along with many positive aspects and impacts.

Plantation will be done after the construction work immediately. Plantation of indigenous trees species is highly important to maintain the biodiversity and ecological balance. It is also important to prevent global warming, soil erosion and pollution. Afforestation purifies the environment and helps in reducing the carbon dioxide level. Along with the importance of construction, the afforestation activity will further help in enhancing the socio-economic condition of the area and project sustainability.

Note: *The Forest Department KP may be engaged for carrying out the proposed activates.*

IMPORTANCE OF TREE PLANTATION

- Trees contribute to their environment by providing oxygen, improving air quality, climate amelioration, conserving water, preserving soil, and supporting wildlife.
- Trees control climate by moderating the effects of the sun, rain and wind. Leaves absorb and filter the sun's radiant energy, keeping things cool in summer.
- Trees also preserve warmth by providing a screen from harsh wind.
- Trees also lower the air temperature and reduce the heat intensity of the greenhouse effect by maintaining low levels of carbon dioxide.
- Both above and below ground, trees are essential to the eco-systems in which they reside.
- Trees absorb and store rainwater which reduce runoff and sediment deposit after storms. This helps the ground water supply recharge, prevents the transport of chemicals into streams and prevents flooding.
- Trees, shrubs and turf also filter air by removing dust and absorbing other pollutants like carbon monoxide, sulfur dioxide and nitrogen dioxide.

OBJECTIVES

- To Restore native species
- To improve the quality of air and reduce its pollution
- To add color to the landscape and enhances the beauty of the environment
- To uplift the quality of our living environment through active planting, proper maintenance and preservation of trees together with other vegetation.
- To Protect and conserve flora and fauna of the project area.

ANNEX-XII

- To attract rain which is a positive impact on the project area at all.
- To reduce sedimentation by plantation in the project area which will act as protection wall against wind born dust particles.

AREA ENHANCEMENT PLAN

Plants will be raised along the nearby available project area or along roads, two on either side of the road. Distance from the outer boundary of the RoW and between two plants will be kept as 4 meters. Thus in one kilometer, 250 number of plants are to be raised in single row. Total number of plants will be **34,300** Number.

Four rows of plants will be raised along the 32 Km road, two on either side of the road. Distance from the outer boundary of the RoW and between two plants will be kept as 4 meters. Thus in one kilometer, 250 number of plants are to be raised in single row. Total number of plants, along, 32-kilometer-long road, with 2 plants each sides so total plants will be=**34,300** Number. Thus a total of 34,300 trees shall be planted in lieu of expected **3430** effected plants.

**The Forest Department may update the standards of planting and choice of species as per the requirements and suitability.*

TREES RECOMMENDED

Following trees are recommended for plantation, along this portion of the road on both sides.

Sr. No.	Local Name	Scientific Name
1.	Sukh Chain	<i>Pongamia pinnata</i>
2	Bottle Brush	<i>Callistemon spp</i>
3.	Kikar & Phulai	<i>Acacia nilotica & Modesta</i>
4.	Siris	<i>Acacia lebbek</i>
5.	Jacarnda	<i>Jacaranda moniosifolia</i>
6.	Silver Oak	<i>Grevillea robusta</i>
7.	Shisham	<i>Dalbergia sissoo</i>
8.	Jaman	<i>Eugenia jambolina</i>
9.	Kachnar	<i>Bauhinia variegata</i>

**The Forest Department/ concerned Authority may update the standards of planting and choice of species as per the actual requirements and site suitability.*

COST

Break-up of Expenditure per Avenue kilometer @ Rs. 1500/- per diem: Break-up of Expenditure per Avenue kilometer or 250 plants @ Rs. 1500/- per diem:

FIRST YEAR

Sr. No.	Item	Quantity	Rate	Amount (Rs.)
1.	Layout	1 Av.km	2 MD/Av.km	3000.00

ANNEX-XII

2.	Digging of Pits 2.5 ft. each 2.5x250 = 625 cft.	625 cft.	5 MD/Av.km	7500.00
3.	Cost of Plants including	250 No.	Rs100/- plant	25,000.00
4.	Cost of planting of plants	250 No.	Rs. 25/- plant	6250.00
5.	Carriage of plants from private nursery to site including loading/unloading	250 No.	Rs. 10/- plant	2500.00
6.	Cost of Manure and Bhall (silt) including carriage	1 Av. Km		20,000.00
7.	H/watering 50 times 250x50 with water bowser, one driver and one coolie	12500 no.	5MD/per %0	100,000.00
8.	Weeding twice 250x2	500 no.	2 MD/per %	15,000.00
9.	Reopening of Pits twice (250x2)/cft/pit	500 cft.	2 MD/per %	15,000.00
10.	Unforeseen			5750.00
Total				200,000.00

SECOND YEAR

Sr. No.	Item	Quantity	Rate	Amount (Rs.)
1.	Cost of Plants 20% Restocking	50 No.	Rs.100/- plant	5,000.00
2.	Cost of planting	50 No.	Rs. 25/- plant	1250.00
3.	Carriage of plants	50 No.	Rs. 10/- plant	500.00
4.	H/watering 50 times with water bowser, one driver and one coolie	12500 no.	5MD/per %0	100,000.00
5.	Reopening of Pits twice (250x2)	500 cft.	2 MD/per %	1,5000.00
6.	Weeding twice 250x2	500 no.	2 MD/per %	1,5000.00
7.	Unforeseen			1250.00
Total				1,38,,000.00

THIRD YEAR

Sr. No.	Item	Quantity	Rate	Amount (Rs.)
1.	Cost of Plants 10% Restocking 25 No.	25 No.	Rs.100/- plant	2500.00
2.	Cost of planting	25 No.	Rs. 25/- plant	625.00
3.	Carriage of plants	25 No.	Rs. 10/- plant	250.00
4.	H/watering 40 times x250 no.	10,000 no.	5MD/per %0	75000.00

ANNEX-XII

5.	Reopening of Pits twice (250x2)	500	5MD/per %0	3750.00
6.	Unforeseen			2875.00
Total				85,000.00

FOURTH YEAR

Sr. No.	Item	Quantity	Rate	Amount (Rs.)
1.	H/watering 30 times	7500 no.	5MD/per %0	56250.00
5.	Pruning and cleaning of plants	250 no.	5MD/per %0	1875.00
6.	Unforeseen			1875.00
Total				60,000.00

Cost for raising 1 Av. Km and Maintenance or 250 plants in single row: = Rs.4,83,000/-
For 4 years

Total cost for 34,300 plants and their maintenance for 4 years (two on each side) =
Rs. 66,267,600/- or say

Total Cost= 66.67 Million

**The above calculations and standards are approximate and tentative provided on the basis of available data which may be updated by the implementing agency as per actual, during implementation.*

**ANNEX-XIII: RESOURCE
CONSERVATION PLAN**

RESOURCE CONSERVATION PLAN

1. INTRODUCTION

The most of the resources in this world are finite and non-renewable in nature. We are completely dependent on these resources to fulfill all our daily requirements. Therefore, sustainable development calls for the need to conserve resources in a way that meet our needs of present generation as well as future generation, especially the non-renewable resources.

2. OBJECTIVE OF THE PLAN

The Resource Conservation Plan is intended to make an effort towards achieving sustainable development. The objective of the resource conservation plan is to:

- Minimize the use of natural resources; and
- Mitigate and prevent pollution contaminating the natural resources.

3. PLANNING

Careful estimations of quantities of material, fuel, water and energy required directly or indirectly shall be done to avoid excessive or unnecessary wastage of these materials. In addition to this, pollution prevention strategies shall also be devised to prevent contamination of resources.

The estimations include the following:

- Estimation of construction material required for the project;
- Estimation of fuel consumption for construction machinery, construction vehicles and generators;
- Estimations of the energy requirements during all the stages of the project; and
- Estimations of water consumption for construction activities and construction camp sites.
- Strategies shall be planned to reduce loads on the identified resources to be consumed;
- Best management practices shall be devised to control or reduce pollution resulting from the activities during different stages of the project; and
- An inspector shall be assigned responsibility to oversee the ongoing activities to check the compliance of the planned strategies.

4. EXECUTION OF THE PLAN

The planned strategies shall be implemented to conserve the natural resources including but not limited to the following:

Material

- Material supplied shall be in conformance with the estimated quantities and excess material shall be returned to the supplier;

ANNEX-XIII

- Material wastage shall be avoided by using best management practices;
- Waste produced during the project execution shall be disposed off safely to the designated disposal sites through approved contractors; and
- Reuse of the materials shall be appreciated.

Energy

- Reduce trips and optimize routes to and from the construction site for all kinds of activities;
- Regular maintenance of equipment and vehicles to avoid leaks and sustain efficient fuel consumption;
- Switch off idle equipment and vehicles to avoid wastage of fuel;
- Minimize warm up time, unnecessary acceleration and deceleration of the construction equipment and vehicles;
- Avoid unnecessary burning of fuel for cooking in construction camps;
- Avoid unnecessary use of heating and cooling systems during extreme weathers events;
- Construction shall start in early hours of the day to avoid heat in summers and utilization of day light; and
- Alternate energy sources shall be considered for electricity generations during construction and operation to conserve fossil fuel as it is non-renewable resource.

Water

- Avoid using potable water for sprinkling, curing and washing of equipment and vehicles. Surface water or treated effluent can be used instead;
- Wastage of water should be controlled through providing proper valves and through controlling pressure of the water;
- Unnecessary equipment washings should be avoided;
- Awareness amongst workers shall be raised to conserve water and immediately report for any leaks detected; and
- Ensure protection of canal water from contamination resulting from construction activities.

Pollution

- Emissions shall be reduced and controlled as far as possible and direct discharges to air shall be avoided by strictly adhering to the mitigation measures outlined in EIA report;
- Waste water shall not be discharged directly into the canal and must be managed as per the recommendations presented in EIA; and
- Construction and demolition waste, and municipal solid waste shall not be dumped and burnt openly, and shall be handled according to the preventative measure given in EIA study.

ANNEX-XIII

5. CHECKING AND CORRECTIVE ACTIONS

The PMU-NHA shall bind the CC through contract agreement to comply with the strategies outlined in the Resource Conservation Plan. The Environmental Committee shall also appoint an Inspector who shall monitor the daily onsite activities and shall report any issues and concerns raised in relation to Resource Conservation Plan. The inspector shall recommend adequate corrective actions to mitigate the issues raised.

PHOTOLOG

PICTORIAL VIEW OF FIELD ACTIVITIES





PICTORIAL VIEW OF DEPARTMENTAL CONSULTATIONS



Meeting with Superintendent Engineer, Irrigation Department Peshawar Division



Meeting with Deputy Director EPA, Peshawar Division



Meeting with DFO Forest, Peshawar Division



Meeting with Deputy Director Social Welfare and Women Development Complex Peshawar Division