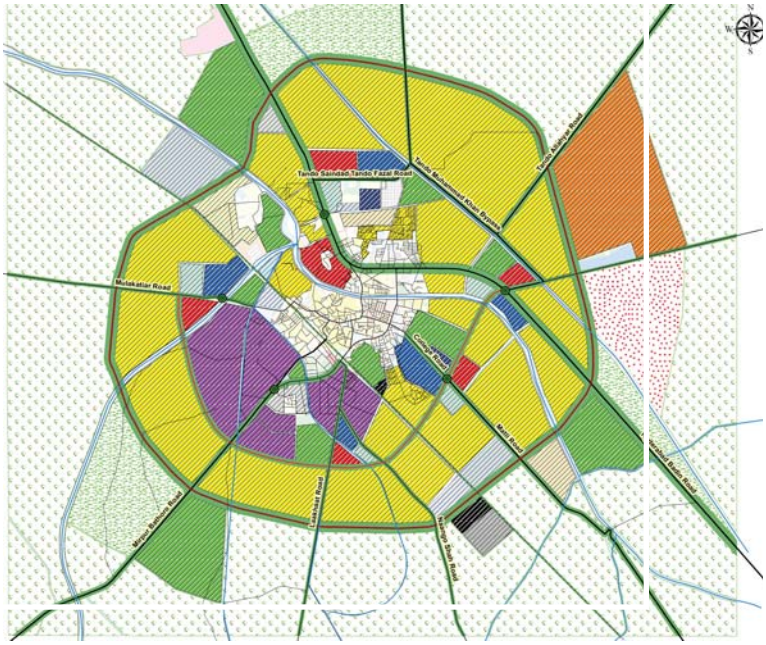
Directorate of Urban Policy Strategic Planning,
P & D Department, Government of Sindh

URBAN POLICY & STRATEGIC PLANNING
P & D DEPARTMENT GOVT OF SINDH

# PREPARATION OF DEVELOPMENT MASTER PLANS OF FOURTEEN (14) DISTRICT HEADQUARTER TOWNS OF HYDERABAD, MIRPURKHAS AND SHAHEED BENAZIRABAD DIVISIONS"

# STRATEGIC DEVELOPMENT PLAN REPORT

## (2017- 37)



# Tando Muhammad Khan

*February, 2021*

EA Consulting Pvt Ltd
(Formerly Engineering Associates)
Engineering, Architecture & Project Management
Head Office: AL-9, 15th Lane, Khayaban-e-Hilal,
Phase VII, D.H.A., Karachi-75500.,
Tel: UAN: 111-111-585, Fax: (021) 3584-1829

In Association with

MMP
MMP Pakistan (Pvt) Ltd.

# TRANSMITTAL LETTER

Urbanization in Pakistan is taking place at a substantially high pace most of which is gravitating to the large cities. The secondary cities have not been able to play their role as the "Engine of Economic Growth" due to lack of public funding in the development infrastructure resulting in lop-sided spatial spread. The hinterland has remained poor facing abject poverty due to less economic opportunities, social facilities and institutional support.

Sindh Government took initiative by establishing Directorate of Urban Policy and Strategic Planning (UPSP) within the Planning and Development Department in 2012, to initiate and ensure planned growth of secondary cities of Sindh province through the preparation of Master Development Plans of District Headquarters Towns. In this phase 14 DHQ Towns of Hyderabad, Mirpurkhas and Shaheed Benazirabad Divisions Viz Nawabshah, Sanghar, Naushahro Feroze, Mirpurkhas, Mithi, Umerkot, Tando Muhammad Khan, Tando Allahyar, Mitiari, Badin, Thatta, Sujawal, Dadu, Jamshoro and one SDG compline taluka Islamkot Town.

Directorate of Urban Policy and Strategic Planning initiated Consultant selection process under SPPRA rules. The consortium of three reputable local Consultants led by EA Consulting (Pvt.) Ltd. including MMP (Pvt.) Ltd. and EMC (Pvt.) Ltd was selected due to their high standing in prequalification and lowest financial bid. The Consultants brought together a highly qualified and experienced team to provide the specialized inputs. The data collection was carried out in the field through a sample socio – economic surveys, questionnaires to various government offices and discussions with the stakeholders. The findings and recommendations were submitted to client for review in seven stages and shared with the stakeholders in workshop for each town. This report is the final Deliverable (Strategic Development Plan Report) of the project.

The volume and spatial spread of the project area did present lot of logistics and data availability problems which were resolved with the support of Client who had pursued actively with the various lines departments to assure all available data to Consultants. The Consultant's team is indebted to the Director General UPSP and his team without their support it would not have been possible to complete this project. The consultant would also like to thank all the district officials for making field exercise productive.

## ACKNOWLWDGEMENT

The completion of this assignment would not have been possible without the guidance and support of Directorate of Urban Policy & Strategic Planning, Planning & Development Department, Government of Sindh led by Mr. Faisal Ahmed Uqaili (Director General) and team members Mr. Zulfiqar Kumbhar (Deputy Director Housing/P&DC), Ms. Naila Haq (Deputy Director Environment), Ms. Uzaima Nasir Hilaly (Deputy Director Municipal Finance & Governance), Mr. Nabesh Akhtar (Deputy Director Municipal Services), Mr. Dayal Das Rathore (Assistant Director GIS) and Mr. Gulab Ahmed Tanvari (Assistant Director Planning).

The consultant is also thankful to Ex- Director Generals' UP&SP, Mr. Khair Muhammad Kalwar, Mr. Khalid Mehmood Shaikh, Mr. Muhammad Ali Khoso & Mr. Rafique Ahmed Qureshi and Mr. Mumtaz Halepoto Ex- Director Urban Policy & Planning, UP&SP.

EA Consulting Pvt Ltd acknowledges fair & transparent conduct of Financial Contract Management for this assignment carried out by this Directorate of UP&SP under the management and administration of respective Director Generals and Ms. Uzaima Nasir Hilaly Director Admin, Finance & Management.

Moreover, the consultant also appreciates the support of all the District &, line Departments officers/ officials for extending their valuable input and coordination during the preparation of this assignment.

# PREPARATION OF DEVELOPMENT MASTER PLANS OF FOURTEEN (14) DISTRICT HEADQUARTER TOWNS OF HYDERABAD, MIRPURKHAS & SHAHEED BENAZIRABAD DIVISIONS

## Strategic Development Plan Report- Tando Muhammad Khan

## Table of Contents

1. SINDH – AN OVERVIEW ..... 2
- 1.1 PROJECT BACKGROUND ..... 2
- 1.2 GENERAL ISSUES ..... 2
- 1.3 OBJECTIVES ..... 3
- 1.4 THE STRATEGIC PLAN OUTPUT ..... 4

2. AN OVERVIEW OF TANDO MUHAMMAD KHAN AND ENVIRONMENTS ..... 5
- 2.1 TANDO MUHAMMAD KHAN DISTRICT ..... 5
  - *2.1.1 Topography and Geology ..... 6*
  - *2.1.2 Geographical Location and Area ..... 6*
  - *2.1.3 Administrative Set-up ..... 7*
  - *2.1.4 Demography ..... 7*
  - *2.1.5 Climate ..... 7*
  - *2.1.6 Ethnicity, Culture and Politics ..... 8*
  - *2.1.7 Major Linkages ..... 9*
- 2.2 URBAN MORPHOLOGY ..... 10
- 2.3 LAND USE AND SPATIAL ANALYSIS ..... 11
- 2.4 EXISTING ZONAL PLAN: ..... 13

3. VISION FOR STRATEGIC DEVELOPMENT PLAN OF TANDO MUHAMMAD KHAN ..... 15
- 3.1 SUMMATION OF VISION FORMULATION ..... 15
- 3.2 TANDO MOHAMMAD KHAN'S VISION STATEMENT ..... 16

4. PROPOSED MASTER PLAN OF TANDO MUHAMMAD KHAN TOWN ..... 18
- 4.1 SPATIAL PATTERN ..... 18
- 4.2 BASIC URBAN FORM ..... 19
- 4.3 PROPOSED MASTER PLAN ..... 20
  - *4.3.1 Salient Features of Planning ..... 21*
  - *4.3.2 Ring Road with Northern and Southern Bypasses – Connecting Existing with Outer Developments ..... 22*
  - *4.3.3 Radial Roads – Regional Connectivity ..... 22*
- 4.4 PROPOSED LAND USE ZONING ..... 23
  - *4.4.1 Residential Zone ..... 26*
  - *4.4.2 Commercial Zone ..... 28*
  - *4.4.3 Economic Zone ..... 29*

*4.4.4 Livestock Zone ..... 30*
*4.4.5 Industrial Zone ..... 31*
*4.4.6 Health and Welfare Zone ..... 33*
*4.4.7 Educational Zone ..... 34*
*4.4.8 Religious Zone ..... 36*
*4.4.9 Public Administration Zone ..... 36*
*4.4.10 Recreational Zone ..... 37*
*4.4.11 Graveyards Zone ..... 39*
*4.4.12 Transportation Zone ..... 39*
*4.4.13 Utilities and Services Zone ..... 42*
*4.4.14 Urban Forestation Zone ..... 43*
*4.4.15 Agricultural Zone ..... 44*
*4.4.16 Water Bodies ..... 44*
*4.4.17 Vacant Zone ..... 45*

5. HOUSING ..... 47

5.1 EXISTING SITUATION ..... 47
5.2 KATCHI ABADIS ..... 48
5.3 KATCHI ABADIS OF TANDO MUHAMMAD KHAN DHQ TOWN ..... 48
5.4 AVAILABLE HOUSING STOCK ..... 49
5.5 ISSUES ..... 49
5.6 SWOT ANALYSIS ..... 50
5.7 NEED ASSESSMENT ..... 51
5.8 POLICY GUIDELINES ..... 51
*5.8.1 Policy Measures for Land ..... 51*
*5.8.2 Policy Measures for Housing Finance ..... 52*
*5.8.3 Policy Measures for Katchi Abadis, Squatter Settlements & Slums ..... 52*
*5.8.4 Policy Measures for Low Income Housing ..... 52*
5.9 STRATEGIC DEVELOPMENT PLAN ..... 53
5.10 PRIORITY PROJECTS ..... 54

6. SOCIAL INFRASTRUCTURE ..... 57

6.1 EDUCATION ..... 57
*6.1.1 Existing Situation ..... 57*
*6.1.2 Condition of Educational Institutions ..... 57*
*6.1.3 Issues ..... 60*
*6.1.4 SWOT Analysis ..... 60*
*6.1.5 Present Need Assessment 2017 ..... 60*
*6.1.6 Future Assessment (2037) ..... 62*
*6.1.7 Policy Guidelines ..... 63*
*6.1.8 Strategic Development Plan ..... 63*
*6.1.9 Priority Projects ..... 64*
*6.1.10 Immediate Action Plan for Core Urban Area ..... 67*
6.2 HEALTH ..... 71
*6.2.1 Existing Situation ..... 71*
*6.2.2 Issue ..... 73*
*6.2.3 SOWT Analysis ..... 73*
*6.2.4 Present Need Assessment 2017 ..... 73*

*6.2.5 Future Assessment (Population, Bed Ratio) ..... 74*
*6.2.6 Policy Guidelines ..... 74*
*6.2.7 Strategic Development Plan ..... 74*
*6.2.8 Priority Projects ..... 75*
*6.2.9 Immediate Action Plan for Core Urban Area ..... 77*
6.3 RECREATIONAL/TOURISM/CULTURE ..... 78
*6.3.1 Existing Situation ..... 78*
*6.3.2 Issues/Problems ..... 79*
*6.3.3 SWOT Analysis ..... 80*
*6.3.4 Policy Guidelines ..... 81*
*6.3.5 Strategic Development Plan ..... 81*
*6.3.6 Priority Projects ..... 82*
*6.3.7 Immediate Action Plan for Core Urban Area ..... 85*

7. ECONOMIC DEVELOPMENT PLAN ..... 87

7.1 AGRICULTURE ..... 88
*7.1.1 Existing Situation ..... 88*
*7.1.2 SWOT Analysis ..... 89*
*7.1.3 Issues/ Problems ..... 89*
*7.1.4 Strategic Development ..... 89*
*7.1.5 Economic Development ..... 91*
7.2 LIVESTOCK ..... 92
*7.2.1 Existing Situation ..... 92*
*7.2.2 Issues and Problems: ..... 93*
*7.2.3 Need Assessment ..... 93*
*7.2.4 Strategic Development ..... 93*
7.3 FISHERIES ..... 93
*7.3.1 Existing Situation ..... 93*
*7.3.2 Issues ..... 94*
*7.3.3 SWOT Analysis ..... 94*
*7.3.1 Need Assessment ..... 95*
*7.3.2 Strategic Development Plan ..... 95*
*7.3.3 Economic Development ..... 95*
7.4 INDUSTRIES ..... 97
*7.4.1 Existing Situation ..... 97*
*7.4.2 Types of Industries ..... 97*
*7.4.3 Occupation ..... 97*
*7.4.4 SWOT Analysis ..... 98*
*7.4.5 Strategic Development Plan ..... 98*
*7.4.6 Priority Projects ..... 98*
7.5 TRADE AND COMMERCE ..... 101
*7.5.1 Issues ..... 101*
*7.5.2 SWOT Analysis ..... 101*
*7.5.3 Strategic Development Plan ..... 101*
*7.5.4 Immediate Action Plan for Core Urban Area ..... 103*
7.6 ECONOMIC DEVELOPMENT PLAN OF HEADQUARTER TOWN WITH POVERTY REDUCTION STRATEGY (PRS) ..... 105

8. BASIC UTILITIES ..... 107

8.1 WATER SUPPLY ..... 107
*8.1.1 Existing Situation ..... 107*
*8.1.2 Current Water Supply / Demand ..... 107*
*8.1.3 Issues ..... 109*
*8.1.4 SWOT Analysis ..... 110*
*8.1.5 Need assessment ..... 110*
*8.1.6 Sindh Drinking Water Policy 2017 ..... 110*
*8.1.7 Strategic Development Plan ..... 111*
*8.1.8 Priority projects ..... 112*
*8.1.9 Immediate Action Plan for Core Urban Area ..... 116*
8.2 SEWERAGE AND DRAINAGE ..... 118
*8.2.1 Existing Situation ..... 118*
*8.2.2 Issues: ..... 120*
*8.2.3 SWOT Analysis ..... 120*
*8.2.4 Need Assessment ..... 121*
*8.2.5 Sindh Sanitation Policy 2017 ..... 121*
*8.2.6 Strategic Development Plan ..... 123*
*8.2.7 Priority Projects ..... 123*
*8.2.8 Immediate Action Plan for Core Urban Area ..... 126*
8.3 SOLID WASTE MANAGEMENT ..... 128
*8.3.1 Existing Situation ..... 128*
*8.3.2 Hazardous Waste: ..... 129*
*8.3.3 Issues: ..... 129*
*8.3.4 SWOT Analysis: ..... 130*
*8.3.5 Need Assessment ..... 130*
*8.3.6 Policy Guidelines ..... 130*
*8.3.7 Strategic Development Plan ..... 131*
*8.3.8 Priority Project ..... 132*
*8.3.9 Immediate Action Plan for Core Urban Area ..... 135*
8.4 FIREFIGHTING ..... 137
*8.4.1 Existing Situation ..... 137*
*8.4.2 Need assessment ..... 137*
*8.4.3 Strategies ..... 137*

9. INFRASTRUCTURE ..... 138

9.1 TRANSPORTATION ..... 138
*9.1.1 Existing Situation ..... 138*
*9.1.2 Regional Connectivity (Air, Rail, Road) ..... 138*
*9.1.3 Issues and Problems ..... 140*
*9.1.4 SWOT Analysis ..... 140*
*9.1.5 Policy Guidelines ..... 142*
*9.1.6 Sindh Empowerment of 'Persons with Disabilities' Act, 2018 ..... 142*
*9.1.7 Strategic Development Plan ..... 143*
*9.1.8 Priority Projects: ..... 144*
*9.1.9 Immediate Action Plan ..... 147*
9.2 COMMUNICATION ..... 151
*9.2.1 Telephone, Mobile, Internet ..... 151*
*9.2.2 SWOT Analysis ..... 151*

*9.2.3 Importance of Communication Infrastructure in Agriculture Sector:* ..... *152*
9.3 ENERGY ..... 152
*9.3.1 Existing Situation* ..... *152*
*9.3.2 SWOT Analysis* ..... *154*
*9.3.3 Issues and Problems* ..... *154*
*9.3.4 Strategic Development Plan* ..... *154*
*9.3.5 Immediate Action Plan* ..... *156*
9.4 GAS SUPPLY ..... 157
*9.4.1 Existing Situation* ..... *157*
*9.4.2 Strategic Development Plan* ..... *157*

10. ENVIRONMENT ..... 158

10.1 EXISTING SITUATION ..... 158
*10.1.1 Ecologically Sensitive Areas* ..... *159*
*10.1.2 Ecological Baseline* ..... *159*
10.2 SWOT ANALYSIS ..... 160
10.3 ISSUES AND PROBLEMS ..... 161
10.4 POLICY GUIDELINES ..... 161
10.5 STRATEGIC DEVELOPMENT ..... 162
10.6 IMMEDIATE ACTION PLAN ..... 163

11. DISASTER RISK MANAGEMENT ..... 164

11.1 EXISTING SITUATION ..... 164
*11.1.1 Floods* ..... *164*
*11.1.2 Impact of 2012 Floods* ..... *166*
11.2 PUBLIC SAFETY ..... 168
11.3 ISSUES AND PROBLEMS ..... 173
11.4 POLICY GUIDELINES ..... 174
11.5 STRATEGIC DEVELOPMENT ..... 174
11.6 LONG TERM PLAN ..... 174
11.7 SHORT TERM PLAN ..... 175
11.8 PRIORITY PROJECTS ..... 175

12. CLIMATE CHANGE EMERGENCY CONTINGENCY PLAN ..... 177

12.1 PAKISTAN METEOROLOGICAL DEPARTMENT ..... 178
12.2 HEALTH DEPARTMENT ..... 179
12.3 EDUCATION DEPARTMENT ..... 180
12.4 AGRICULTURE DEPARTMENT ..... 180
12.5 LIVESTOCK AND FISHERIES DEPARTMENT ..... 181
12.6 PLANNING AND DEVELOPMENT DEPARTMENT ..... 181
12.7 REVENUE DEPARTMENT ..... 182
12.8 POLICE DEPARTMENT ..... 182
12.9 CIVIL DEFENSE ..... 183
12.10 CIVIL SOCIETY AND PRIVATE SECTOR RESPONSE ..... 183
12.11 SCOUTS ..... 184
12.12 STANDARD OPERATING PROCEDURES (SOPS) ..... 184
12.13 IMPLEMENTATION AND MONITORING ..... 186
*12.13.1 Indicators* ..... *186*

*12.13.2 Responsibility of Plan Implementation ..... 190*

13. URBAN LAND MANAGEMENT ..... 192

13.1 INTRODUCTION ..... 192
13.2 GOALS ..... 192
13.3 OBJECTIVES ..... 192
13.4 URBAN LAND MANAGEMENT IN TANDO MUHAMMAD KHAN ..... 193
13.5 LAND POOLING AND RECONSTITUTION ..... 193
*13.5.1 Land Management Techniques ..... 194*
13.6 SWOT ANALYSIS AND NEED ASSESSMENT ..... 195

14. IMPLEMENTATION STRATEGY ..... 198

14.1 PROCESS OF IMPLEMENTATION ..... 198
14.2 IMPLEMENTATION AGENCY ..... 198
14.3 LEGAL FRAMEWORKS ..... 199
14.4 INSTITUTIONAL ENHANCEMENT ..... 200
14.5 IMPLEMENTATION SCHEDULE ..... 202

## LIST OF TABLES

TABLE 2-1 DEMOGRAPHIC STATISTICS: DISTRICT TANDO MUHAMMAD KHAN ..... 7
TABLE 2-2: LAND USE CLASSIFICATION AND PERCENTAGES ..... 12
TABLE 3-4-1: PROPOSED LAND USE CLASSIFICATION FOR TANDO MUHAMMAD KHAN ..... 24
TABLE 5-1: HOUSING STATISTICS ..... 49
TABLE 5-2: HOUSING BACKLOG ..... 51
TABLE 6-1: PRESENT EDUCATION INSTITUTIONS AND ENROLMENT RECORD AT TALUKA LEVEL ..... 58
TABLE 6-2: PRESENT EDUCATION INSTITUTIONS AND ENROLMENT RECORD (SECONDARY AND HIGHER SECONDARY SCHOOLS) ..... 58
TABLE 6-3: PRESENT TECHNICAL INSTITUTIONS AND ENROLMENT RECORD ..... 59
TABLE 6-4: EDUCATION SECTOR OF TANDO MUHAMMAD KHAN DISTRICT ..... 61
TABLE 6-5: PRESENT NEED OF CLASSROOMS IN TALUKA TANDO MUHAMMAD KHAN ..... 61
TABLE 6-6: REQUIREMENT OF CLASSROOMS IN TALUKA TANDO MUHAMMAD KHAN ..... 62
TABLE 6-7: FUTURE REQUIREMENT OF CLASSROOMS IN TANDO MUHAMMAD KHAN DISTRICT DISTRICT ..... 62
TABLE 6-8: FUTURE REQUIREMENT OF CLASSROOMS IN TANDO MUHAMMAD KHAN TALUKA ..... 63
TABLE 6-9: GOVERNMENT AND PRIVATE HEALTH FACILITIES WITH BED CAPACITY IN DISTRICT TMK ..... 71
TABLE 6-10: PRESENT NEED ASSESSMENT OF HEALTH SECTOR AT DISTRICT LEVEL (2017) ..... 73
TABLE 6-11: FUTURE NEED ASSESSMENT AT DISTRICT LEVEL ..... 74
TABLE 7-1: COMPARISON OF LAND UTILIZATION ..... 88
TABLE 7-2: LIVESTOCK POPULATION ..... 92
TABLE 7-3: VETERINARY SERVICE ..... 92
TABLE 7-4: WATER BODIES, FISH FARMS & PRODUCTION IN TANDO MUHAMMAD KHAN ..... 94
TABLE 7-5 : EXISTING INDUSTRIAL UNITS AT TMK DISTRICT ..... 97
TABLE 8-1: POPULATION AND WATER DEMAND PROJECTED UP TO YEAR 2037 ..... 110
TABLE 8-2: SEWAGE GENERATION PROJECTIONS ..... 121
TABLE 8-3: HAZARDOUS WASTE (HEALTHCARE WASTE) SOURCE AND ESTIMATION IN T.M. KHAN ..... 129
TABLE 9-1: ELECTRICITY CONNECTION STATUS IN TANDO MUHAMMAD KHAN DISTRICT ..... 152

TABLE 11-1 : HAZARDS MATRIX OF TANDO MUHAMMAD KHAN ..... 164
TABLE 11-2 : POTENTIAL TERRORISTS THREAT ..... 169
TABLE 12-1: AUTHORITIES RESPONSIBLE FOR IMPLEMENTATION OF PLAN ..... 190

## LIST OF FIGURES

FIGURE 2:1: TEHSIL MAP OF T.M. KHAN ..... 5
FIGURE 2:2: LOCATION MAP OF TANDO MUHAMMAD KHAN ..... 6
FIGURE 2:3: HISTORICAL GROWTH OF TMK ..... 10
FIGURE 2:4: LANDUSE MAP OF TANDO MUHAMMAD KHAN TOWN ..... 11
FIGURE 2:5: EXISTING ZONAL MAP ..... 14
FIGURE 5-1: HOUSING PROPOSAL TANDO MOHAMMAD KHAN TOWN ..... 56
FIGURE 6-1: MIR GHULAM ALI KHAN TALPUR GOVT. BOYS DEGREE COLLEGE TMK ..... 57
FIGURE 6-2: EDUCATIONAL INSTITUTIONS IN TANDO MUHAMMAD KHAN TOWN ..... 59
FIGURE 6-3: EDUCATIONAL PROPOSALS FOR TANDO MOHAMMAD KHAN ..... 66
FIGURE 6-4: REHABILITATION OF EDUCATIONAL FACILITIES OF CORE URBAN AREA OF TANDO MUHAMMAD KHAN ..... 68
FIGURE 6-5: HEALTH MAP OF TANDO MUHAMMAD KHAN MC ..... 72
FIGURE 6-6: EDUCATIONAL PROPOSALS FOR TANDO MOHAMMAD KHAN ..... 76
FIGURE 6-7: REHABILITATION OF HEALTH FACILITIES CORE URBAN AREA OF TANDO MUHAMMAD KHAN ..... 77
FIGURE 6-8: PARK IN TMK ..... 78
FIGURE 6-9: RECREATIONAL PROPOSALS FOR TANDO MOHAMMAD KHAN ..... 83
FIGURE 6-10: RELIGIOUS PROPOSALS FOR TANDO MOHAMMAD KHAN ..... 84
FIGURE 6-11: PROPOSED RECREATIONAL (CORE URBAN AREA OF T.M KHAN) ..... 86
FIGURE 7-1: AGRICULTURE PROPOSALS FOR TANDO MOHAMMAD KHAN ..... 90
FIGURE 7-2: PROPOSED LANDUSE FOR LIVESTOCK RELATED ACTIVITIES FOR TANDO MOHAMMAD KHAN ..... 96
FIGURE 7-3: PROPOSED ECONOMIC PROPOSALS FOR TANDO MOHAMMAD KHAN ..... 99
FIGURE 7-4: PROPOSED ECONOMIC PROPOSALS FOR TANDO MOHAMMAD KHAN ..... 100
FIGURE 7-5: PROPOSED COMMERCIAL PROPOSALS FOR TANDO MOHAMMAD KHAN ..... 102
FIGURE 7-6: REHABILITATION OF COMMERCIAL AREA - CORE URBAN AREA OF TANDO MOHAMMAD KHAN ..... 104
FIGURE 8:1: PUMPING ROOM OF NASIRABAD STATION ..... 107
FIGURE 8:2: PUMP ROOM OF PANDHI WAH STATION ..... 108
FIGURE 8-3: EXISTING WATER SUPPLY WORKS IN TANDO MUHAMMAD KHAN MC ..... 108
FIGURE 8-4: PROPOSED LANDUSE FOR UTILITIES RELATED SERVICES (WATER SUPPLY) FOR TANDO MOHAMMAD KHAN ..... 116
FIGURE 8-5: REPAIR & REHABILITATION OF WATER SUPPLY NETWORK FOR CORE TOWN AREA TMK ..... 117
FIGURE 8-6: RAW SEWAGE DISCHARGE FROM PUMPING STATION ..... 118
FIGURE 8-7: BAD CONDITION OF STRUCTURE AT SEWAGE LIFT STATION ..... 118
FIGURE 8-8: LOCATION OF DISPOSAL STATIONS ..... 119
FIGURE 8-9: PROPOSED LANDUSE FOR UTILITIES (SEWERAGE & DRAINAGE) RELATED SERVICES TMK ..... 126
FIGURE 8-10: REPAIR & REHABILITATION OF SEWERAGE AND DRAINAGE NETWORK FOR CORE TOWN AREA TMK ..... 127
FIGURE 8-11: PROPOSED LANDUSE FOR UTILITIES (SOLID WASTE) RELATED SERVICES TMK ..... 134
FIGURE 8-12: PROPOSED GARBAGE COLLECTION POINTS FOR CORE URBAN AREA TANDO MOHAMMAD KHAN ..... 136
FIGURE 9-1: PROPOSED TRANSPORTATION LANDUSES FOR TANDO MOHAMMAD KHAN ..... 146
FIGURE 9-2: MODEL WALKWAYS ..... 148
FIGURE 9-3: REHABILITATION OF EXISTING ROADS OF CORE URBAN AREA OF TMK ..... 150
FIGURE 9-4: PROPOSED LANDUSE FOR ELECTRIC POWER RELATED SERVICES FOR TANDO MOHAMMAD KHAN ..... 155
*FIGURE 11:1: FLOOD HAZARD MAP OF TANDO MUHAMMAD KHAN (SEPTEMBER 2012)* ..... 165

*FIGURE 11:2 CROWDED PLACES OF DHQ TOWN TANDO MUHAMMAD KHAN* ..... 169
FIGURE 12:1: FOUR PHASES OF A RESILIENCE INITIATIVE, AND THE TIMING OF BASELINE AND POST-SHOCK..... 187
FIGURE 13-1: FUTURE ADMINISTRATIVE PROPOSAL OF TANDO MUHAMMAD KHANS ..... 197
FIGURE 14-1: PROPOSED LANDUSE OF PUBLIC ADMINISTRATION FOR TANDO MOHAMMAD KHAN ..... 201

# LIST OF ANNEXURES

Annexure – A : Sustainable Development Goals Acceleration Plans

Annexure – B: Atlas

# LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| ADP | Annual Development Plan |
| AGR | Annual Growth Rate |
| BC | Brick Construction |
| BHU | Basic Health Unit |
| BOD | Biological Oxygen Demand |
| CBD | Central Business District |
| CC | Climate Change |
| DBM | Digital Base Map |
| DCs | Deputy Commissioners |
| DHQ(s) | District Headquarters |
| DMP | Disaster Management Plan |
| DRM | Disaster Risk Management |
| DRR | Disaster Risk Reduction |
| DSPC | Development Strategies & Prevalent Condition |
| DUP&SP | Directorate Of Urban Policy & Strategic Planning, Government of Sindh |
| ECP | Emergency Contingency Plan |
| EDP | Economic Development Plan |
| EMC | Environmental Management Consultants |
| EPA | Environmental Protection Act |
| FWO | Frontier Works Organization |
| GBHS | Government Boys High School |
| GBHSS | Government Boys High Secondary School |
| GBLSS | Government Boys Lower Secondary School |
| GBPS | Government Boys Primary School |
| GER | Gross Enrolment Ratio |
| GGHS | Government Girls High School |
| GGHSS | Government Girls Secondary School |
| GGLSS | Government Girls Lower Secondary School |
| GGPS | Government Girls Primary School |
| GIS | Geographic Information System |
| GOP | Government of Pakistan |
| GOS | Government of Sindh |
| GPS | Global Positioning System |
| HESCO | Hyderabad Electricity Supply Corporation |
| HH | Household |
| HQ | Head Quarters |
| KA(s) | Katchi Abadis |
| KV | Kilo Volt |
| LPG | Liquid Petroleum Gas |
| LULC | Land Use/Land Cover |
| MC | Municipal Committee |

| | |
|---|---|
| MISC | Multiple Indicator Cluster Survey |
| MW | Mega Watt |
| NER | Net Enrolment Ratio |
| NGO | Non-Governmental Organization |
| NPDMP | National & Provisional Disaster Management Policy |
| NRM | National Reference Manual |
| O&M | Operation & Maintenance |
| OH | Over Head |
| P&D | Planning & Development Department |
| PCU(s) | Passenger Car Units |
| PDAO | Planning & Development Act Ordinance |
| PDMA | Provincial Disaster Management Authority |
| PGS | Population Growth Scenarios |
| PH | Peak Hour |
| PHED | Public Health Engineering Department |
| PMTs | Pole Mounted Transformers |
| PR | Public Representative |
| PTCL | Pakistan Telecommunication Limited |
| RAP | Resilience & Adaptability Plan |
| RCC | Reinforced Cement Concrete |
| SAR | Situation Analysis Report |
| SB&TPR | Sindh Building & Town Planning Regulation |
| SBI | Sindh Board Of Investment |
| SDI | Spatial Data Information |
| SECP | Securities & Exchange Connection Of Pakistan |
| SED | Socio Economic Data |
| SES | Socio Economic Survey |
| SEPA | Sindh Environmental Protection Agency |
| SME(s) | Small Medium Enterprises |
| SOP | Standard Operation Procedures |
| SPPRA | Sindh Public Procurement Regulatory Authority |
| SS | Sample Survey |
| SSGC | Sui Southern Gas Company |
| STP | Sewerage Treatment Plant |
| SWM | Solid Waste Management |
| SWOT | Strength Weaknesses Opportunities Threat |
| TMK | Tando Muhammad Khan |
| TOR | Terms Of References |
| TSS | Total Suspended Solids |
| TVC | Traffic Volume Count |
| TW | Tube Well |
| UC | Union Council |
| UG | Under Ground |
| UG/l | Concentration of Arsenic (10 micro-gm/litre) |

| | |
|---|---|
| W&SD | Work & Services Department |
| WAPDA | Water and Power Development Authority |
| WATSAN | Water & Sanitation |
| WASH | Water, Sanitation & Hygiene |
| WB | World Bank |
| WHO | World Health Organization |

# STRATEGIC DEVELOPMENT PLAN REPORT-TANDO MUHAMMAD KHAN

# EXECUTIVE SUMMARY

## A. PROJECT AREA BRIEF

Tando Muhammad Khan derived its name from Mir Muhammad Talpur. It was declared as a district in June 2005. District Tando Muhammad Khan is comprised of three talukas i.e. Tando Muhammad Khan, Bulri Shah Karim and Tando Ghulam Hyder. District has 16 Union Councils and 161 Mouzas. Tando Muhammad Khan District shares its borders with Hyderabad in North, Tando Allahyar in North-East, Badin in South & East, Sujawal in South-West and River Indus flows in West direction. District is famous for making well-known cultural symbols of Sindh such as “Ajrak”, “Farasi” and “Kashi”. It is primarily an agro-based district. According to 2017 census, population of the district is 677,228 souls.

Tando Muhammad Khan has its district headquarters at Tando Muhammad Khan City. The town is located at 25° 8’ N and 68° 32’ E at an elevation of 11 meters on the right bank of Phuleli Canal at a distance of 21 miles from Hyderabad. Mostly town seems to be sprawling in three directions, i.e. north, south-west and south-east directions but the pace is slow. The infrastructure in town is continuously under pressure due to un-planned development. The built-up area of Tando Muhammd Khan MC comprises of around 900 acres of land but the spread of urban areas as estimated by the consultants is 3,992 acres. The land use analysis indicates that almost 24% of total urban boundary area is in residential use. The zonal plan of Tando Muhammad Khan comprises of five zones.

## B. VISION 2037

As per the objective of the Provincial Government, the planning process was carried out in consultation with the stakeholders.

A vision formulating workshop was carried out with the main stakeholders on November 07, 2018. The stakeholders were mainly local citizens, government officials, businessmen and members of Civil Society. They were so logged down with the immediate day to day problems that they could not articulate a long term vision. However, the collection of opinions expressed produced the following vision:

***"The city fulfilling all the basic needs, such as housing, water supply and sanitation, in clean and sustainable pollution free environment, with education and health for all, along with growth in local and regional economy with increase in employment, incomes and related skills development to emerge as well planned modern city with peace, security and prosperity like some of the most livable cities in the world."***

## C. DEMOGRAPHY

District Tando Muhammad Khan has its district headquarters at Tando Muhammad Khan City. It is a Municipal Corporation. According to 1998 census, town had a population of 65,396 souls. The 2017 census reveals that the population of Tando Muhammad Khan Town has reached to about 101,863 souls with an annual growth rate of 2.36% during 1998-2017. Projected population of the city works out to be 162,410 souls by 2037.

## D. SECTOR WISE ANALYSIS AND PROPOSAL

The Consultants had carried out data collections in three layers:

- Primary source including sample Socio-economic Survey.
- Secondary Source including data from government sources published and unpublished documents
- Discussions with the officials, Consultations with Stakeholders.

The present need analysis and constraints were compiled and submitted in the form of Situation Analysis Report. Consultative Workshops were held in respective DHQ Towns with an objective to validate the accuracy of data and verify the data analysis with the Stakeholders.

Keeping in view the stakeholder's comments and suggestions, the draft strategies were developed to fulfill needs in the most efficient way. The Draft Strategic Development Report submitted by the Consultants was again shared with the Stakeholders and their feedback/comments. Being solicited.

Thereafter, the Final Strategic Report will be submitted. Based on the approved strategies the final action will be the preparation of Long Term/Short Term Plans, Priority Plan and Immediate Action Plan for Core Urban Area.

Based on the evaluation of primary and secondary data, the need assessment has been carried out for a projected population on the basis of 20 years growth projections. The need assessment is based on the Baseline Indicators, Stakeholders Views, Demand vs Need Analysis, NRM with professional judgment and Consultant's own experience and standards used in other developing countries.

### 1. Housing

Housing in terms of affordable home with basic infrastructure and facilities is the basic human need. According to 2017 census population results, Tando Muhammad Khan MC had household size of 5.0 persons and a total housing stock of 20,536. The major issues in the housing sector are scarcity of developed urban land, poor land administration, housing in dilapidated condition, unafforable housing cost for low income groups, unchecked growth of Katchi Abadis to 8 in number,

shortage of finance, high cost of building material, high density housing causing congestion and lack of basic utilities.

On the basis of projected population for year 2037 the numbers of households have been estimated around 32,482 on fixed household size of **5.0** persons out of which additional housing requirement will be 11,587. The short term plan includes the development of cost effective approaches, formation of land bank, initiation of an affordable housing programme and formulation of green building bye laws . The strategies for long term plan are incremental housing schemes, establishment of low-income housing funds and increase number of small size plots. The priority projects should focus on the Development of Housing Site / Scheme for Low Income People and land acquisition for Development of Housing Site / Schemes for Low Income People to fulfill present gape.

## 2. Social Amenities

### 2.1 Education

The present number students enrolled in schools of Tando Muhammad Khan taluka are 27,876. Students are studying at 286 different levels of schools. The available number of classrooms for primary, middle and secondary are 796. The number of teaching staff working in different schools of the taluka is 1,236. The issues of this sector are shortage of classrooms and teachers, low enrolment level with gender disparity, lack of provision of basic and allied facilities and poor condition of schools and colleges. The future need is of 2340 classrooms in schools, high schools and colleges by the end of plan period in 2037. Short term plan, for taluka provision of 74 classrooms at schools of different levels are required with the repairing of existing buildings with all basic facilities and training of teaching staff is required. The long term plan target is to achieve 100% enrolment with a 1:1 male-female ratio by 2037; therefore, 2,340 additional classrooms will be required to accommodate upcoming generation for the next twenty years. This need could be fulfilled either by addition in existing buildings or more new schools and colleges will need to be constructed in future to serve an additional estimated population of 384,487. The priority projects need to focus on rehabilitation of schools & allied infrastructure and establishment of Various capacity Building Training Programmes to enhance Teaching / Academic capacities. The immediate action plan includes the repair and rehabilitation and up gradation of schools and colleges located in core urban area.

### 2.2 Health

In District Tando Muhammad Khan, there is one civil hospital having 30 beds, 15 BHUs at district having 32 beds and three RHCs having 34 beds. There are three private hospitals with 100 number of beds, National Institute of Cardiovascular Diseases having 100 bed and Indus Medical College and Hospital having 500 beds; there are a total of 796 beds serving the district. The major issues in the health sector are vacant posts of doctors and medical staff, lack of training and housing facilities for LHW and paramedical staff, difficult access to healthcare facilities, insufficient health facilities, lack of diagnostic and other health equipment, difficulty in transferring patients from rural areas to hospitals. The NRM

(National reference Manual) recommends 2 beds per thousand as the medium-term target. On this basis, approximately 1,344 beds will be required gradually. Even though, available beds are 796, further 548 beds are required to fulfill the present need of the inhabitants for bed capacity. The shortage of doctors and paramedical staff, laboratory equipment, diagnostic services and quality of buildings are an evident problem in small/medium towns and will need to be tackled with an increase in beds. Therefore, the target up to the year 2037 is to provide 2 beds per 1000 projected district population as per standard is given in the National Reference Manual on Planning and Infrastructure Standards (NRM). The required beds for 2037 are 1,344 and doctors are 1,070; the given numbers are excluded from the private hospitals and Clinics. The strategies for short term plan are improve access to healthcare facilities, access through ambulance network, availability of skilled workforce, improving functionality of equipment and availability of quality medicines and rehabilitation of BHUs and RHCs. The long term plan includes the extension of teaching hospital, provision and enhancement of Mobile Health Unit, upgradation of BHUs, RHCs and MCHCs, health awareness programmes, research programmes for doctors, provision of diagnostic facilities, ambulance, pharmacy in all hospitals, specialized hospitals, and accommodation facilities for doctors and paramedics staff. The priority projects should focus on the provision of missing facilities at DHQ / Civil Hospital. The immediate action plan involves the Repair & Rehabilitation of DHQ Hospital.

### 2.3 Recreational

The recreational places in Tando Muhammad Khan includes Mir Ghulam Ali Khan Talpur Municipal Park and Shaheed Benazir Bhutto Park. There are shrines of various Sufis and Saints in this area. The major issues of this sector are lack of planned open spaces, lack of preservation of recreational spots, in-active tourist development programme, weak tourist marketing, encroachments and unavailability of playgrounds.

The strategies for short term plan need to focus on the maintenance and restoration of existing open spaces, development and preservation of cultural heritage, construction and rehabilitation of family parks, playgrounds and recreational facilities, construction of auditoriums and upgradation of art councils. The long term plan includes the provision of recreational infrastructure of international standards, maintenance of historical and religious sites, youth development programmes and promotion of tourism. The priority projects include construction of multipurpose sports grounds/stadiums and repair and rehabilitation of Shaheed Benazir Bhutto Park. The immediate action plan includes the rehabilitation of Mir Ghulam Ali Talpur Park.

## 3. Economic Development

### 3.1 Irrigation

District Tando Muhammad Khan has a well-established irrigation system. The names of main canals and branches are the Phuleli canal, Akram wah, Pinyari Canal, and Guni wah. In addition to this, there also exist some Sam Nalas in taluka Tando Ghulam Hyder & Bulri Shah Karim under the command of Sindh Irrigation & Drainage Authority (SIDA). However, other modes like river water and tube wells

are also used for irrigation purposes. The supply of sufficient irrigation water for future agricultural growth is expected to be available.

### 3.2 Agriculture

Tando Muhammad Khan contributes significantly in agriculture sector because its climate is suitable for production of various crops. Crops cultivated in this region are sugarcane, rice, wheat, mustard, gram, etc. Tando Muhammad Khan is an ideal place for sugarcane cultivation. The total geographical area of District Tando Muhammad Khan is 195,000 hectares out of this cultivated area is up to 144,000 hectares. Out of cultivable land dividing 2016-17, actually cultivated to 94,000 hectares leaving 50,000 hectares as fallow. Wasteland available to 24,000 hectares, whereas, 27,000 hectares are not available for utilization. The major issues are high price of inputs, absence of farm to market road, lack of improved seeds, lack of agriculture credit facilities, absence of agriculture research centers and high rate of diesel.

The short term plan needs to focus on modernizing agriculture, increasing supply and quality of crops and provision of warehouses. The long term plan includes agriculture technology development and enhancing crop productivity. The priority projects focuses on provision of agriculture credit facilities, regular supply of irrigation water, increase in crop production, installation of tube wells, construct farm to market roads and measures to reduce water logging and salinity. The recommendations for economic development plan are provision of agriculture credit facilities, regular supply of irrigation water, increase in crop production, installation of tube wells, construct farm to market roads and measures to reduce water logging and salinity, continuous agriculture research and investment through public and private sector partnership.

### 3.3 Livestock and Fisheries

The latest census of livestock was performed in 2006, therefore it is taken in consideration. In the animal population of district, highest number belongs to buffalos having 158,000 heads followed by goats 136,000 heads and cattle 57,000. Whereas Tando Muhammad Khan Town's animals' population comprises of 55,947 buffalos, 21,934 cattle and 46,813 goats. The livestock is served by four veterinary hospitals. Unfortunately, this sector despite being the second most important sector in the local economy, has not been given due importance in the past. The scattered cattle farms will need to consolidate away from population outside the town. The major issues are limited knowledge and facilities, livestock being a secondary source of income, reduced area for natural grazing and insufficient veterinary services. There are 98 private fish production farms in TMK District. There are 215 fish farms in which 215 fishermen are experiencing their luck and 35 are the fish dealers in Tando Muhammad Khan. These fishermen are earning their wages by utilizing 10 sailboats and 20-rowboats and annual fish production is 397.47 M.tons[1]. There is a need to develop and implement a broad-based fisheries policy which is required for accelerated development of the fisheries sector. The strategies need to focus on improving the production performance of livestock, ~~enhancement of livestock production~~, establishment of model livestock, new cattle and dairy farms, increased veterinary services, lease of fishing rights, local awareness, aquaculture development, and collection

[1] Fisheries Department TMK

of statistical fish data and enforcement of fisheries enactment. The recommendations for economic development plan includes the participation of private sector, development and implementation of a broad-based fisheries policy for the development of the fisheries sector, including construction of landing areas business halls.

### 3.4 Industries

Tando Muhammad Khan is primarily an agro-based district and the industrial base in this district is dependent on the agriculture. This district has established industries which are related to the agriculture i.e. the raw material for these industries is provided by the agriculture sector. Besides, this district is the second largest Ajrak in Pakistan. So a huge small scale Ajrak making industry is well established in this district. Besides there are sugar mills, flour mills, and rice mills in this district.

The short term development plan includes the modernization of service sector, enhancement of colonization, provision of vocational training and employable skills and micro-financing to industries. The strategies for long term plan are sufficient market infrastructure, development of planned Industrial Estates, heritage saving, shift from industrial agriculture to diversified agro-ecological systems and provision of infrastructure for establishment of new industries. The priority projects involves the provision of subsidized loans for rehabilitation of Ajrak Industry of Tando Mohammad Khan.

### 3.5 Trade and Commerce

There is the presence of strong local retail market along the main road with numerous food shops. There are several banks and mobile facilitation centres. ~~The major issues of this sector are demise of local agriculture market and un-planned local business activities~~. Major trade and commerce facilities lies in Zone 1. The Phuleli, College and Mulakatiar roads are passing through this zone. The main landmarks are railway station, DHQ Hospital, Mir Ghulam Ali Talpur Park, Post Office, Press Club, Police Station, SSP Office, etc. The major issues of this sector are failure of PPP, demise of local agriculture market and un-planned local business activities.

The priority projects includes the provision of slaughter house, provision of parking facilities, establishment of fruit and vegetable market, specialized wholesale market, construction of building for service industry and provision of cold storages and warehouses. The immediate action plan focuses on the rehabilitation & beautification of main Bazar area i.e. Kiran Chowk, Aqsa Masjid market area /chowk, markets along main Phuleli Road.

## 4. Basic Utilities

### 4.1 Water Supply

At present, there are two intake points located at Nasirabad / Phuleli Canal and second connection is from Pandhi Wah. The overall water supply from Phuleli Canal and its main branch is 2.58 mgd. For present population of 101,863 persons in 2017, the water requirement daily at 30 gpcd is approximately 3.06 mgd. The issues of water supply are weak institutional arrangements and co-ordination mechanisms, high proportion of non-revenue water, dysfunctional water supply schemes, ageing infrastructure, poor water quality, two non-functional SSF plants, no operation and maintenance practices, high dependency on depleting and contaminated ground water. The water requirement for 2037 is projected as 4.87 mgd. The short term development plan includes the design of water supply pipes that ensure no water contamination and preference should be given to rehabilitate the existing schemes. The long term plan needs to focus on the access to safe water, frame a broad policy framework, feasibility study for identification of new water sources, and exploration and regulation of ground water. The priority projects involves the improvement of water intake works, repair & rehabilitation of existing water supply network, and provision of new water supply network for unserved area. ~~and Repair & Rehabilitation of existing OH Tank (2 Nos).~~ The immediate action plan includes the Repair and rehabilitation of water supply network in the core town.

### 4.2 Sewerage and Drainage

The existing system of Tando Muhammad Khan comprises Domestic or Sanitary Wastewater which refers to liquid discharge from residences, business buildings, and institutions. Industrial waste is discharged from manufacturing plants. Municipal wastewater is the general term applied to liquid collected in sanitary sewers/drains discharge reaching sewage disposal station/sump well from where it should go to stabilization pond but at present raw sewage without treatment is either discharged to the Phuleli Canal or to ditches.

The major issues of this sector are damaged lines, overflowing sewage on the streets, improper operation and maintenance of sewerage facilities, inefficient record of operation and maintenance works, informal settlements, poor condition of drainage system and untreated sewage discharged into irrigation canal. Sewerage water flows at 70% of the water supply therefore, presently against the water demand of 3.06 mgd the sewerage water flows is 2.14 mgd.

In the next twenty years 3.41 mgd sewerage water will be generated against the estimated water supply of 4.87 mgd. The strategies for short term plan include priority for sanitation given to un-served areas, development of sanitation plan, need based interventions, use of gravity flow systems, to acquire land and provision of proper sewage treatment plants leading up to recycling of treated affluent for landscaping, etc. The long term plan includes the provision of improved services, sewage treated before discharging, and construction of WWTP and land acquisition for stabilization ponds. The priority projects need to focus on the repair & rehabilitation of primary and secondary drains, construction of new drainage network for unserved areas and construction of sewage treatment plant.

The immediate action plan involves the repair and rehabilitation of drainage network of core urban area.

### 4.3 Solid Waste Management

Some of the major issues are shortage of machineries, lack of properly organized waste collection system, no proper arrangement for the disposal of infectious and hazardous waste and segregation of organic waste. Considering the waste generation rate for design purposes as 0.45 kg per capita per day with the current (2017) population of the municipal committee of Tando Muhammad Khan as 101,863, the total municipal solid waste load arising in the municipality is approx. 48,550 kg or 48.5 tons per day.

It is estimated that by the end of the plan period in 2037, the solid waste production will rise to 73.08 tons per day. The strategies for short term plan are to develop an effective and efficient solid waste collection system, segregate the bio-medical waste collection system and encourage on-site reuse and recycling. The long term plan includes the community and private sector involvement, public awareness and education and implementation of waste minimization. The priority project should focus on the feasibility study for ~~the construction of central compositing plant~~ solid waste management mechanism, and procurement for land acquisition process for landfill site. The immediate action plan includes improvement in solid waste management system and installation of collection points.

## 5. Infrastructure

### 5.1 Energy

The power supply to Tando Muhammad Khan (MC) is through HESCO-WAPDA transmission system. Some of the major issues are of persisting supply short fall, frequent breakdowns, and load shedding, less public awareness regarding fuel conservation, scarcity and high price of alternate fuel sources, lack of maintenance of power plants, circular debt and theft of electricity.

The strategies for the development plan includes the development of low cost energy production systems, achieving fuel efficiency, adopting new technologies, addition of sub-stations and encourage energy efficient building construction. The priority projects should focus on the up gradation of grid stations, promotion of energy efficient appliances and feasibility study for alternate energy sources. The immediate action plan focus on the installation of wall mounted street lights in core town area.

### 5.2 Gas Supply

Out of the 271 houses surveyed by the consultants, 79% had the connection of natural gas available to them. 21% of the houses had no gas availability and fulfilled their needs from alternate sources of fuel for their daily household needs. The strategies need to focus on feasibility study for alternate resources available, measures to cater gas load shedding and appropriately price the energy resources.

### 5.3 Transportation

Tando Mohammad Khan has significant connectivity with surrounding towns as well as other parts of the country through the regional and national road network. It has the direct access to Hyderabad Domestic Airport via Badin-Hyderabad (Provincial Road) located at a distance of 34 kilometers from Tando Muhammad Khan, but due to some technical reasons Hyderabad Domestic Airport is now closed for commercial traffic since 2013. Most of the private transporters run passenger buses and vans on all the regional and national routes. City is also linked via national railway network through main Karachi line. There are no designated bus and truck stands within Tando Muhammad Khan. Major roads within Tando Muhammd Khan Town are Mulakatiar Road, College Road, Hyderabad-Badin Road, Tando Muhammad Khan-Mirpur Bathoro Road and Market/Masjid Aqsa Road.

Drainage issues on road side are evident due to which roads are worsening day by day. Absence of street furniture is another issue due to which traffic incidents takes place. Encroachments and unorganized/illegal Qinqui and Rickshaw stands are also evident on the road side which causes on-street and off-street parking issues.

The strategies for short term plan include expansion of railway station, improving the road design, preventing encroachments, rehabilitation of farm to market roads, reduce traffic growth and congestion. The long term plan includes creation of the Traffic Engineering Bureaus (TEBs), declaring private vehicle free zones, satisfying mobility needs, implementation of Axle Load Management, dualization of main arteries and improving geometry of roads. The priority projects should focus on the repair & rehabilitation of major and minor roads, and streets and installation of traffic signals and new Solar Street Lighting on Main Roads. The immediate action plan includes the Repair & Rehabilitation of the roads including Phuleli Road, Civil Hospital Road, College Road, Mirpur Bathoro Road and Mulakatiar Road. There should be improvement in road pavements with green medians, road markings, signals, pedestrian crossings and provision of footpaths with street furniture.

### 5.4 Communication

A significant rural population uses phones to remain connected with their outstation relatives and friends. Regarding Internet and Wifi, the survey conducted by the consultants shows that approximately 8% households have the facility of landline and remaining don't have the landline facility. Importance of Communication Infrastructure is that a well-maintained communication network is the basic requirements for an efficient and profitable agricultural sector.

District government needs to improve market and support service infrastructure including farm-to market Roads. There need to be increased and sustained investments in communication infrastructure in rural areas.

## 6. Environment and Disaster Risk Management

### 6.1 Environment

The Seismic zoning map of Pakistan (2015) places Tando Muhammad Khan in Zone 2A, a possibility of minor to moderate seismic hazards. There are three major types of forests in the study area. The central part of the district is dominated by agricultural fields and human habitations. The major issues are; water logging and salinity, water contamination, low quality of surface water, seismic risk, and ageing of surface drainage canal system and polluted air.

The strategies for short term plan proposed are; to ensure environmental sustainability, enforcement of permit to discharge waste, preserve ecological cycles, increase rangelands production, create environmental awareness, conserve biodiversity and fostering PPP. The long term plan includes the improvement of drainage, sustainable development while overcoming environmental challenges and multi-pronged approach to fisheries management.

### 6.2 Disaster Risk Management

Tando Muhammad Khan District is one of the newly created districts of Sindh, which was hit by 2010 and 2011 rains/floods but the relative severity of floods was ranked as medium in the district. The floods of 2011 had devastating effect on this district, as all the Union Councils were affected in three talukas. The major issues are low level of risk awareness, not “risk conscious” development, insufficient DRR capacity, negligible involvement of private sector, riverine flood and food security problem.

The strategies for short term plan includes to develop coordination mechanism with PMD, develop mechanism for regulation of water discharge, develop monitoring mechanism, provide necessary medical facilities, coordination with DDMA and emergency declaration at all medical points. The long term plan involves the arrangements that allow the system to switch into emergency mode, clarify mutual roles and responsibilities, DSM and PPHI shall be responsible for providing medical cover to the IDPs, National risk assessment would identify highly vulnerable districts and DRR needs to involve local level actors. “Designated Evacuation Shelters” are provided to the people after the disaster. It is a facility where residents who have fled due to the dangers of a natural disaster may stay for as long as is necessary until the dangers of that natural disaster have receded. The purpose of these facilities is to offer temporary shelter for residents who are unable to return home due to the natural disaster. All public buildings like schools, colleges, etc. or elevated areas would be used as shelter in case of any disaster in Town. Shelters are designated by the municipal government and awareness should be created about them among the general public. The priority projects should focus on the identification and declaration of “disaster affected” areas, DRM strategies should be based upon clear assessments of disaster risks, vigilance of canals, ensure smooth flow of water, prompt dewatering of stagnant water, HESCO should ensure uninterrupted supply of electricity, arrangement of medical teams, fumigate the area, emergency set up of relief camps and ensure sanitation and cleanliness.

## E. IMPLEMENTATION

Presently, different proposals or schemes belonging to their respective sectors are identified by the departments and also incorporated separately in the Annual Development Programme (ADP). This creates a lot of problem as there would not be any harmony in the development of the city, as one scheme may create difficulties and problems for the other. It is necessary that all the public service sectors work together as a package that would result in proper development of the town.

The Government of Sindh would take responsibility of implementing various development proposals by utilizing its maximum resources and by engaging various public offices of government of Sindh, established in town. The concerned agency must ensure that the overall process must go after following themes of implementation process. The overall implementation process to be carried out in coordination with Town Planning and Urban Development Standards (Frameworks) in which redevelopment will be phased to prioritization.

Government may seek technical assistance from all the line department i.e. DUP&SP, Town Planning Department, Municipal Corporation, secretariat of Commissioner and Deputy Commissioner. A committee would be formed as the "Project Management and Implementation Unit" (PMIU) to implement on the Strategic Development Plan. The "Project Management and Implementation Unit" will mainly consist of qualified town and urban planners supported by other technical staff; architects, project managers, engineers, finance officers and any other technical staff expert in their relevant fields.

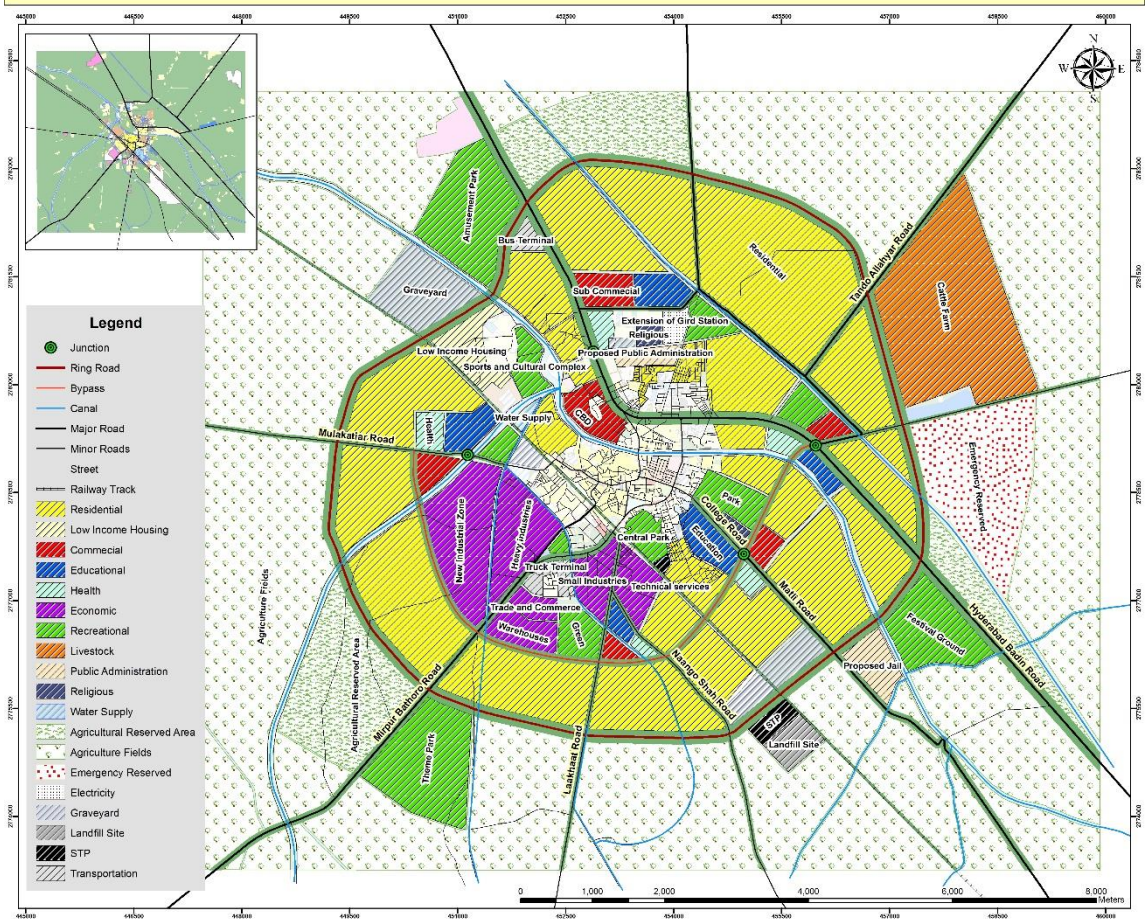
The "Project Management and Implementation Unit" shall supervise and coordinate respective urban developers involved in development activities, conduct monitory audits, prepare evaluation and impact reports. Planning and development department Government of Sindh shall lead "PMIU" to implement Master Plan.

## F. STRATEGIES FOR FUTURE DEVELOPMENT

The strategies focus on revitalization of the affordable housing, provision of basic facilities, efficient transportation and communication, energy efficient technology, active service sector, implementation of pro-active governance, develop human resources, facilitate social infrastructure, reinforce the local governance institutions, modernize administration, preservation of heritage, sustainable environment, develop tourism resources, involve community participation and implementing Public-Private Partnership.

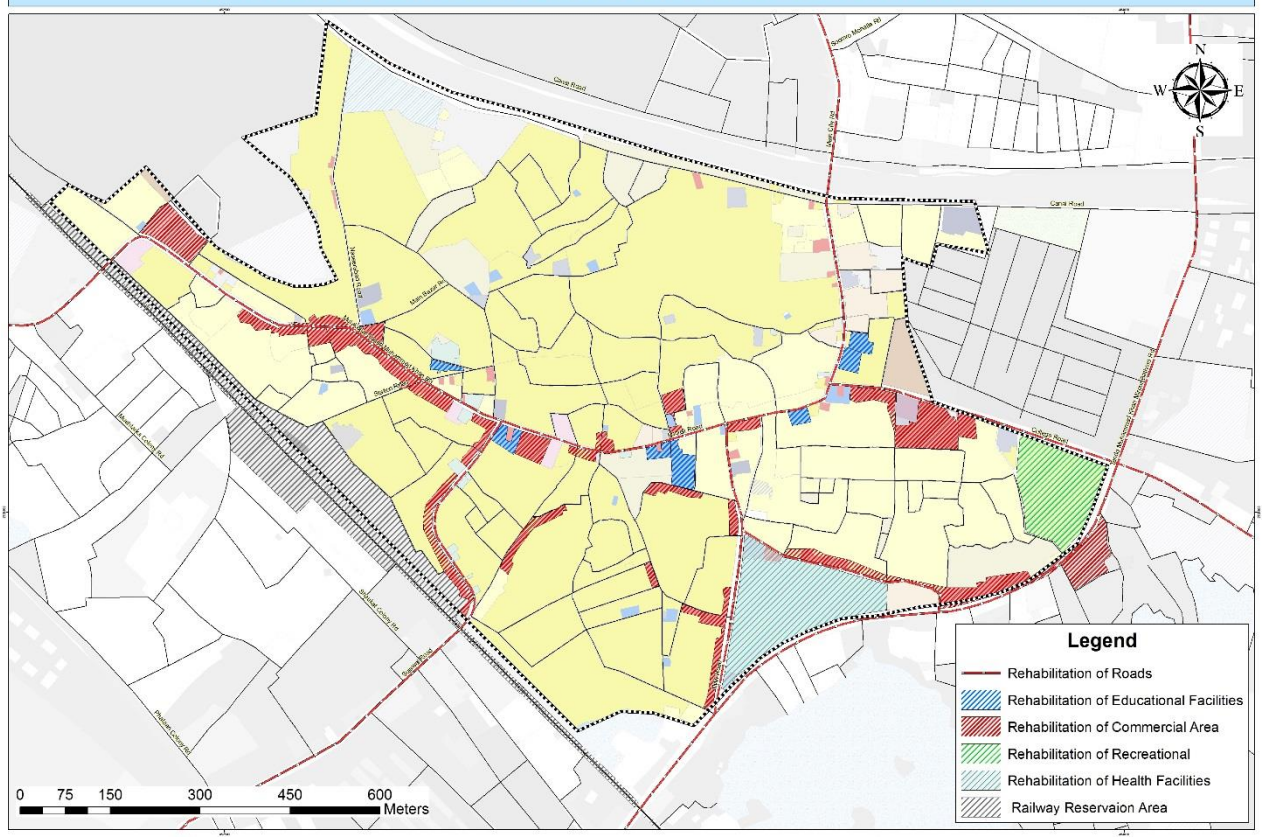
## G. MASTER PLAN PROPOSALS

**Proposed Master Plan for Tando Muhammad Khan Town**



## H. IMMEDIATE ACTION PLAN FOR CORE URBAN AREA

**Immediate Action Plan of Core Urban Area Tando Muhammad Khan**




## I. SDGS ACCELERATION PLAN:

Under the contract of the Preparation of Development Master Plan of 14 DHQ towns, SDG Acceleration Plan was not part of the approved TORs, however keeping in view the Sindh Government's initiatives to mainstream SDGs targets in provincial planning (taking Islamkot as a model SDG Taluka) the Directorate and Consultant after due consultative process felt the need to include brief SDG Acceleration Plan as part of Development Master Plans. Further in consultation with SDG Unit Sindh, SDG 11 – *Sustainable Cities and Communities* was selected for SDG Acceleration Plan for 14 DHQ towns, since it is pertinent to urban planning and development. Please refer Annexure (A) for brief SDGs Acceleration Plan.

# STRATEGIC DEVELOPMENT PLAN FOR

## TANDO MUHAMMAD KHAN TOWN

# 1. SINDH – AN OVERVIEW

Sindh is the most urbanized province in Pakistan. Due to lack of interest in the planning and development of secondary cities District Headquarters towns, the public funding in development infrastructure had been sporadic resulting in un-informed adhoc decisions. Consequently the secondary cities have not been able to play their role as "Engines of Economic growth" and hinterland has remained poor facing abject poverty due to less economic opportunities and social facilities. The poverty head count ratio in the urban-cum-rural areas is almost double than that in the declared urban areas.

Sindh government took initiative by establishing Directorate of Urban Policy and Strategic planning within the P & D Department initiate and ensure planned growth of Secondary cities through the Preparation of Master Development Plans of District Headquarter Towns in September 2008.

## 1.1 Project Background

Sindh, Pakistan's second most populated province plays a pivotal role in the national economic and development agenda. The country's largest port city, Karachi, is the financial capital of the country. The Province comprises of 23% of Pakistan's population and 18% of its land area. It has the highest concentration of urban population at 49% as compared to an overall country average of 32.5%, making it the most urbanized province in the country. With 23% of country's population, its contribution to the national GDP is around 33%. Sindh collects 70% of Pakistan's Income Tax and 62% of Sales Tax.

Sindh has 54% of country's textile units, 45% of its sugar mills, 20% of pulp & paper mills and 35% of edible oil processed locally. Sindh accounts for 34% of total industrial capacity in large scale manufacturing and 25% of small scale manufacturing. Moreover the Province produces 70 % of Country's gas, 30% petroleum and 95% of Coal.

Despite global economic slowdown towards the end of 2008 and Pakistan's solidarity with the International cause for peace, playing a key role as the front line state, Sindh's manufacturing sector has been resilient and investments have continued to pour in the economic cycle. MNCs and local enterprises are committed to make investments worth around USD 8.0 billion in the province in coming years.

Sindh's diversified economy also comprises of a well-developed agricultural base supported by an effective irrigation network on the River Indus. Around 14% wheat, 30% rice, 30% sugar cane, 25% cotton and 30% vegetable crops grown in Pakistan are from Sindh. This provides immense opportunity for setting up export based agri-processing industry in the province. (http://www.sbi.gos.pk/sindh-economy.php).

## 1.2 General Issues

Despite of its significant contribution in National GDP, Sindh has not received the priority in development funding as it deserves. DUP&SP is the medium through which grass root development / strategy is being formulated by professionals for the betterment of people and create de-centralize economical hubs to counter higher migration rate towards developed urban centres resulting better socioeconomic condition

of the people. While going through the available literature so far, several issues have been identified in this regards, such as:

- Non-existence of Sustainable planning policy, apparatus, regulatory framework and its implementation;
- Absence of current housing policy based on sustainable and smart growth mechanism;
- Lack of coordination between institutions responsible for development of a town or Absence of Institutional Framework.
- Previous Master / Development / Structure Plans of Town Planning Department have hardly been implemented due to poor implementation mechanism;
- Local cultural preferences and settlement patterns undermine the role of urbanization in supporting economic growth;
- In most of the District Headquarters Towns, in-effective municipal infrastructure and service delivery is a common cause of failures in water, waste water, SWM, etc.
- Non-existence of spatial and non-spatial database systems;

## 1.3 Objectives

The objective of the assignment, as mentioned in the TORs is to prepare Development Master Plans of Fourteen (14) District Headquarter Towns of Hyderabad, Mirpurkhas and Shaheed Benazirabad Divisions; for development of spatial planning and zoning system as well as local economic development strategies on the basis on ecological sustainability.

The Consultant is tasked to prepare strategies:

- To plan for social infrastructure at affordable standards for education, health, recreation and cultural needs.
- To upgrade the existing physical infrastructure and enhance the supply of potable water and to propose the required capacity of network for water supply, sewerage, drainage, flood waters till year 2037.
- To provide for modern sanitation, solid waste management and disposal.
- To improve existing road networks, extend links, upgrade intersections, bridges and flyovers; and other means of communication and proposed where needed.
- To provide for safe and efficient public transport.
- To plan for effective traffic management, smooth transit and provide for parking facilities, where required in multi-storey car parks.
- To plan for enhancement and revitalization of economic base by expansion of industrial and commercial base, and for rapid expansion of IT and Telecom sectors, tourism, agricultural activity, etc in the means of sustainable and smart concept.
- To propose alternate energy sources as country is facing acute shortage especially in summer season.

## 1.4 The Strategic Plan output

The proposed Development Master Plans of selected District Headquarter Towns of Sindh would focus on the following Tasks

- Review of Past Trends, Development Strategies and Prevalent Conditions
- Preparation of Digital Base Maps
- SWOT Analysis
- Carving out a Vision for the Future of these cities
- Preparation of Development Plan comprising of:
    - Long Term Development Plan
    - Growth Scenarios
    - Short Term Action Plans for Priority Infrastructures
    - Immediate Action Plan for the Core Urban Areas
    - Economic Development Plan
    - Disaster Management Plan and
    - Climate Change, Resilience & Adaptability Plans

# 2. AN OVERVIEW OF TANDO MUHAMMAD KHAN AND ENVIRONMENTS

## 2.1 Tando Muhammad khan District

Sindh is that place in the sub-continent where the Islam emerged first. After the retreatment of Arab conquerors, this region was ruled by the locals like soomras, samas, kalhoras and Mirs. The dynasties of these local rulers remained in power till 1843 A.D. Afterwards, Sindh was annexed by the British.

Mirs established their villages and sites in the jagirs and lands which were bestowed to them by the British rulers. They gave the title "Tando" to these villages and sites established by the particular person. Tando Muhammad Khan derived its name from Mir Muhammad Talpur. In 1791 A.D. Tando Muhammad Khan remained as a much reminisced town of Sehwani Talpurs. Earlier it was a village of Taluka "GUNI" and later on declared as a Taluka and sub-division of Hyderabad. Tando Muhammad Khan remained as a Taluka of Hyderabad District till April 2005, when it was declared as district (June 2005).

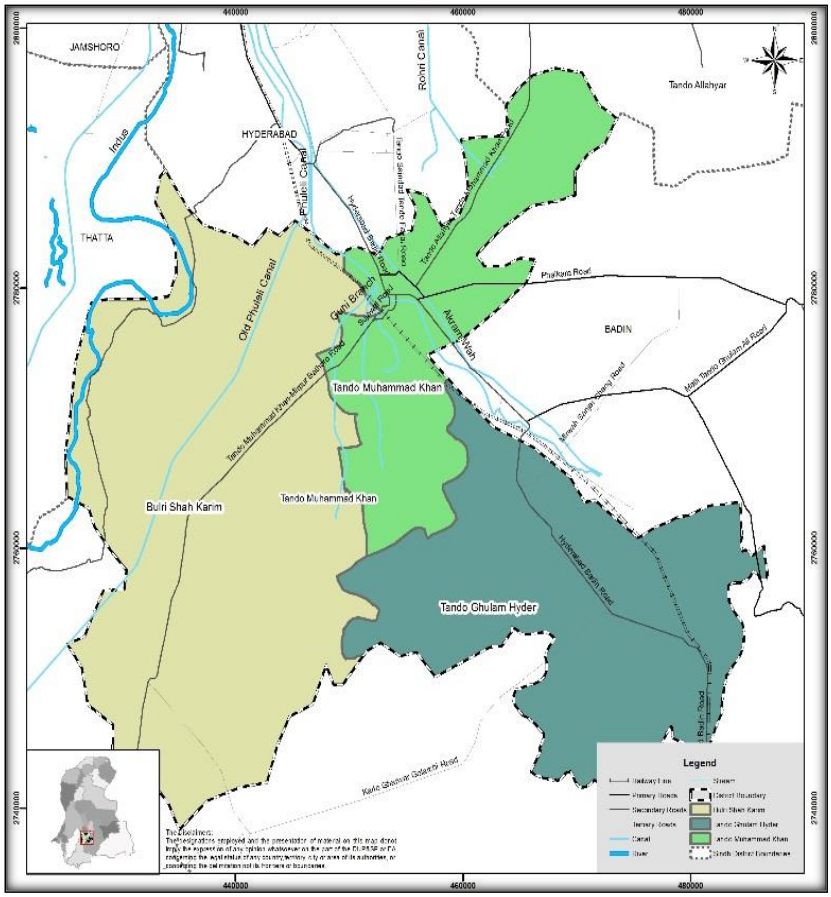



**Figure 2:1: Tehsil map of T.M. Khan**

District Tando Muhammad Khan comprised on three talukas i.e. Tando Muhammad Khan, Bulri Shah Karim and Tando Ghulam Hyder which has population of 677,228[2] with annual growth rate (1998-2017) of 2.31%. Tando Muhammad Khan District share its borders with Hyderabad in North, Tando Allahyar in North-East, Badin in South & East, Sujawal in South-West and River Indus flows in West direction. It has 3 Talukas, 16 Union Councils and 161 Mouzas. According to the latest census of 2017 population of Tando Muhammad Khan MC is 101,863. Taluka Tando Muhammad Khan was declared as district by the Government of Sindh in June 2005.

[2] Census 2017.

District Tando Muhammad Khan is famous for making of well-known cultural symbols of Sindh such as "AJRAK", "Farasi" & "Kaashi". Tando Muhammad Khan is primarily an agro-based district where industrial base is dependent on agricultural production, mainly sugar-cane, which is one of reason that this district has four major Sugar Mills of Sindh province. In this district, wheat and rice are also major crops

District Tando Muhammad Khan has a well-established irrigation system. The names of main canals and branches are Phuleli canal, Akram wah, Ginyari canal and Gooni wah.

### *2.1.1* Topography and Geology

Topography of the project area is plain with average elevation of about 11-meter feet above mean sea level. The land of Tando Muhammad Khan is very fertile because it constitutes the rich alluvial deposits of river Indus. The area is part of the Southern Indus Basin, which is situated at south of the Sukkur rift. The area's geology is primarily composed of sedimentary rocks.

### *2.1.2* Geographical Location and Area

The district Tando Muhammad Khan is located at 25° 8′ N and 68° 32′ E at an elevation of 11 meters on the right bank of Phuleli canal at a distance of 21 miles from Hyderabad.

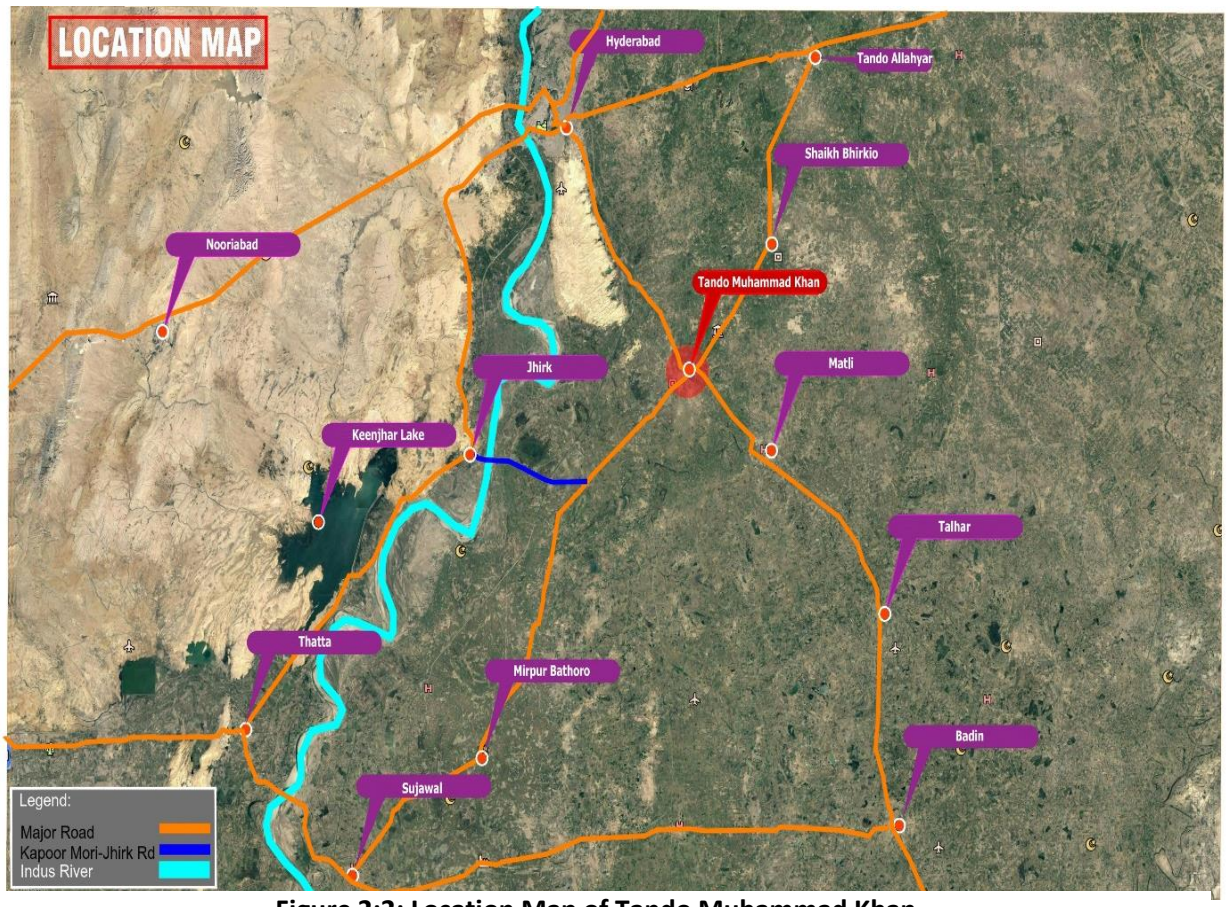



**Figure 2:2: Location Map of Tando Muhammad Khan**

### *2.1.3* Administrative Set-up

District Tando Muhammad Khan consists of three talukas named Tando Muhammad Khan, Bulri Shah Karim and Tando Ghulam Hyder. There are a total 16 union councils spread over 160 dehs. There are a total 161 Dehs out of which 156 are rural, one is urban, 3 are partly urban and one is forest Deh.[3]

### *2.1.4* Demography

In Pakistan, the ratio of the male population is higher than the female population with a sex ratio of 106. It also happens to be among those four countries where life expectancy for females, at birth, is lower than that of males[4]. The sex ratio in TMK is 106.97 which is slightly higher than the ratio at the National level[5]. Though there could be other possible reasons for such a difference in male to female ratio, one probable reason for this ratio could be underreporting of females during national surveys. Besides, a high maternal mortality rate and status and quality of health care facilities may also be contributing factors to this difference. District TMK is rural by its characteristics like the majority of the other districts in Sindh. 82% of the population resides in rural areas as compared to the 18% which reside in the urban areas.[6] According to the latest census 2017 figures, district Tando Muhammad Khan has a population of 677,228 with 131,565 number of households.

**Table 2-1 Demographic Statistics: District Tando Muhammad Khan**

| District | Population | | AGR | | Average Household Size | |
|---|---|---|---|---|---|---|
| | Census 1998 | Census 2017 | Census 1998 | Census 2017 | Census 1998 | Census 2017 |
| Tando Muhammad Khan District | 438,624 | 677,228 | 2.13% | 2.31% | 5.6 | 5.14 |

### *2.1.5* Climate

The climate of Tando Mohammad Khan District is moderate. However, the summer months - April, May, and June - are very hot during the day. The mean minimum and maximum temperatures during this period are 25°C and 45°C respectively. December and January are the coldest months with maximum and minimum temperatures of 30° and 10°C respectively. The Rainfall of the district is highly erratic with an average of about 130 mm. The monsoon dominates from July to September.

[3] A profile of Tando Muhammad Khan – Pakistan Emergency Situation Analysis - USAID
[4] A profile for District Badin: 2009, South-Asia Partnership Pakistan
[5] Labour Force Survey 2010-11: *Pakistan Bureau of Statistics*
[6] Development profile of Tando Muhammad Khan

### *2.1.6* Ethnicity, Culture and Politics

District Tando Muhammad Khan represents the traditional Sindhi culture. Sindhi is the major language of the district, although Urdu is largely spoken and understood. Punjabi, Pushto, Balochi, Brahavi, and Saraiki are also spoken in the city area. The district is famous for making of Ajrak (a unique form of block print shawls that display special designs and patterns made using block printing by stamps). Common colours used while making these patterns may include blue, red, black and yellow. Over the years, Ajrak has become a symbol of the Sindhi culture and tradition. It has been in Sindh since the era of the Moen-jo-Daro Civilization. For the people of Tando Muhammad Khan, Ajrak is not only a symbol of culture but it is also a source for subsistence and survival. A large number of people are associated with different stages of the manufacturing process, market supply, and selling of Ajrak. Tando Muhammad Khan is the second-largest Ajrak making district in the country.

**Historical / Famous Places in Tando Muhammad Khan District**

Tando Muhammad khan is the headquarter town of district Tando Muhammad khan. Tando Muhammad Khan derived its name from Mir Muhammad Talpur In 1791 A.D. Tando Muhammad Khan remained a much-reminisced town of Sehwani Talpurs. Earlier it was a village of Taluka "GUNI" and later on declared as a Taluka and sub-division of Hyderabad. Here are some important and famous places in Tando Muhammad Khan.

**Ajrak Making at TMK**

- Shahjahan Mosque, Sehrani Taluka Bulri Shah Karim
- Sudhorol JA Thul near Mullakatiar Taluka Bulri Shah Karim, Tando Muhammad Khan
- Mir Ghulam Ali Khan Talpur Municipal Park, Tando Muhammad Khan
- Shaheed Benazir Bhutto Park, Tando Muhammad Khan
- Dhandi Mosque UC Janhan Soomro
- Grave of Shaikh Mamo UC Janhan Soomro
- Maqbara Mir Muhammad Khan
- Birth Place of Birbal at Tando Ghulam Hyder

**Shrines / Darghas in Tando Muhammad Khan District**

- Shrine of Hazrat Shah Abdul Karim Bulri Waro
- Dargha Shaikh Bhrakio Achari, at UC Shaikh Bhrakio
- Dargha Main Muhammad Ishaque Mullakatiar, at UC Mullakatiar, Taluka Bulri Shah Karim
- Dargha Sain Abdul Fatah Shah, at UC Tando Saindad, Taluka T.M.Khan
- Dargha Hyder Shah Bukhari, at UC Lakhat, Taluka T.M.Khan

**Shrine of Hazarat Shah Abdul Karim Bulri Waro**

- Dargha Dullah Shah, at Jurai Shah, Taluka T.M.Khan
- Dargha Sabhago Faqeer, at Behrani Muhalla, T.M.Khan
- Dargha Shaikh Fareed at UC Lakhat, Taluka T.M.Khan
- Dargha Burhan Shah, at UC III, Taluka T.M.Khan
- Dargha Jeay Shah, at UC Saeed Matto, Taluka Bulri Shah Karim
- Dargha Parial Shah, at UC Saeed Matto, Taluka Bulri Shah Karim
- Dargha Noh Sarwar, Taluka Tando Ghulam Hyder
- Dargha Jumman Shah, at UC I, Taluka Tando Muhammad Khan
- Dargha Malook Shah, at UC I Taluka Tando Muhammad Khan
- Dargha Sain Ibrahim Shah, at UC I, Taluka Tando Muhammad Khan

### *2.1.7* Major Linkages

Tando Muhammad Khan is connected through major roads in all 4 directions. TMK is connected to Shaikh Birkhio through Tando Allahyar-Tando Muhammad Khan Road to its south-east direction whereas it is connected with Hyderabad in North West direction via Hyderabad Badin road. The other two main roads lie in the south-west direction of town. These are Lakhaat-Tando Muhammad khan Road and Tando Muhammad Khan – Mirpur Bathoro Road. Further, the main roads are connected through branch roads like College Road, Mulaktar Road, and Canal Road on west of the town.

The existing road network in Tando Muhammad Khan district is fairly good. Although there is no national highway passing through this district, yet the provincial highways provide effective connectivity with the district. The district headquarter of Tando Muhammad Khan is connected with its taluka headquarters of Bulri Shah Karim and Tando Ghulam Hyder through metalled roads.

## 2.2 Urban Morphology

The historical growth of Town shapes up along the canal and Hyderabad-Badin road as per the statement of senior citizens of town where economic basis is of agricultural activities. Tando Muhammad Khan was developed as a combination of linear and concentric towns with different locations of services and use of facilities. Tando Muhammad Khan Town is observing fragmentation and is being divided into large parcels bifurcated by Regional interconnected roads and Water canals crossing-by town and can be developed as a regional centre of agricultural activities due to its locational advantage in a rich irrigation system in lower Sindh.

Mostly town seems to be sprawling in three directions, i.e. North, South-west and South-east direction but the pace is slow. In TMK, there are possibilities of urban Densification by introducing vertical growth. The Sindh Building & Town Planning Regulations (Building Control Regime) already provide this possibility and may ease the sprawl along fringes in all towns.

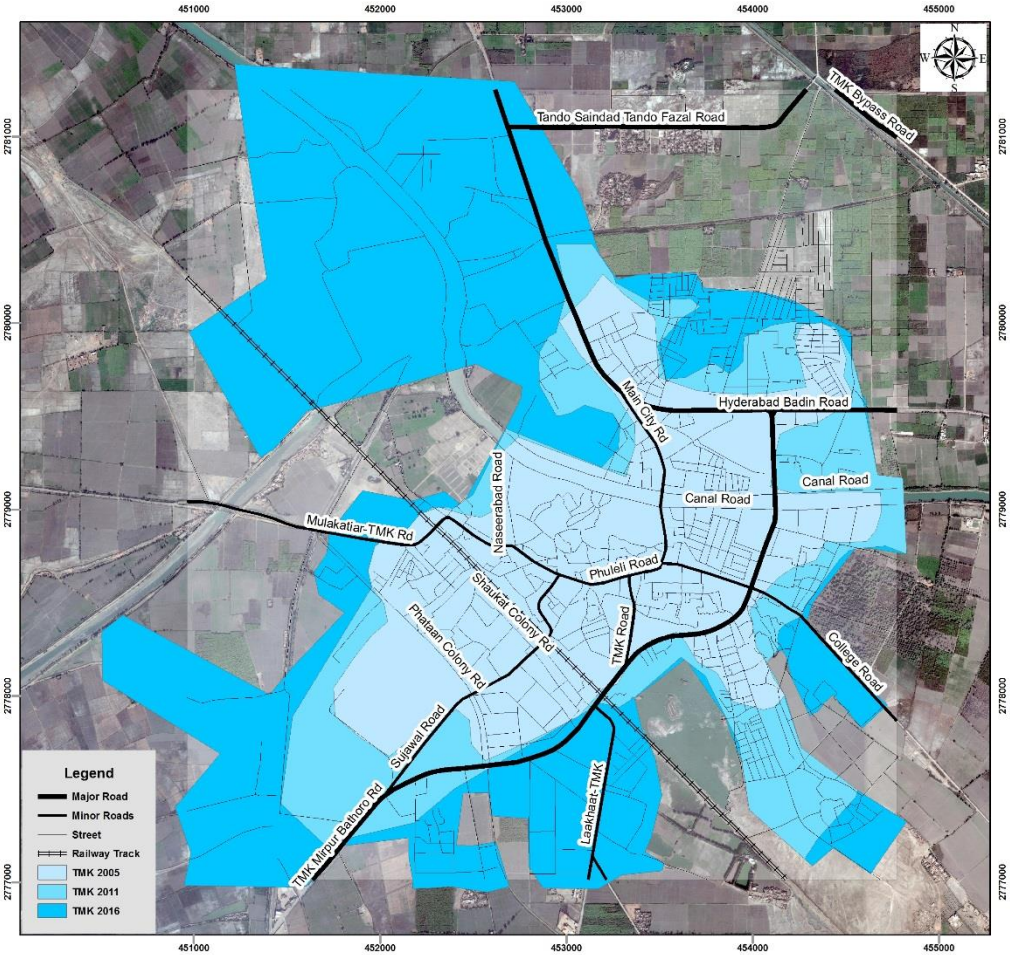



**Figure 2:3: Historical Growth of TMK**

## 2.3 Land Use and Spatial Analysis

The built-up area of Tando Muhammad Khan MC comprises around 900 acres of land on the basis of consultant's suggested urban boundary is 3,992 acres. The land use analysis indicates that almost 24% of total urban boundary area is in use of residential purpose.

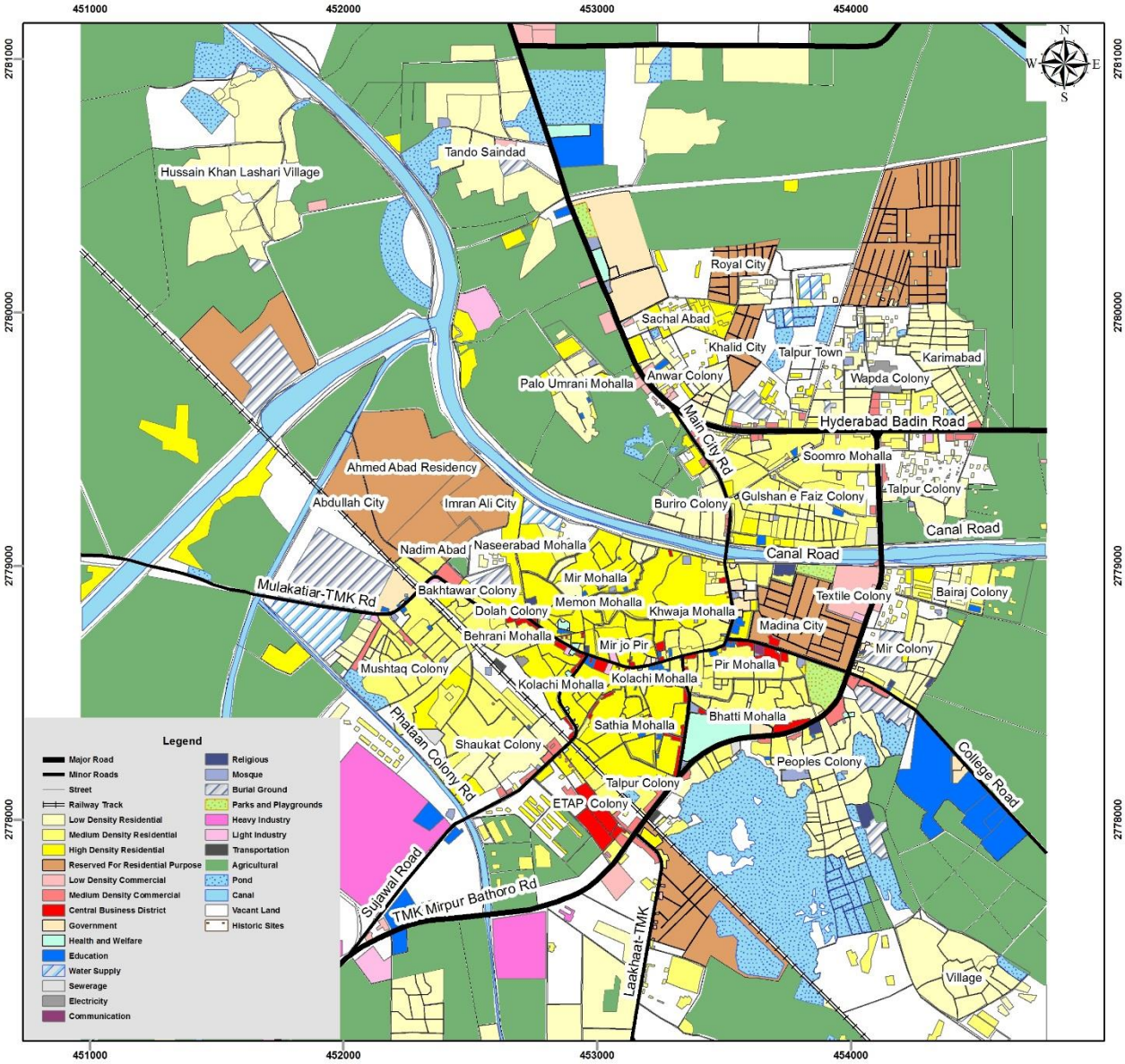



**Figure 2:4: Landuse Map of Tando Muhammad Khan Town**

**Table 2-2: Land use Classification and Percentages**

| TANDO MUHAMMAD KHAN (URBAN BOUNDARY) | | | | 3992.8 | Acres |
|---|---|---|---|---|---|
| **CATEGORIES** | **LANDUSE CLASSIFICATION** | | | **AREA (ACRES)** | **%** |
| **URBAN** | **Residential** | **Residential** | Low Density Residential | 367.9 | 9.2 |
| | | | Medium Density Residential | 202.9 | 5.1 |
| | | | High Density Residential | 189.7 | 4.8 |
| | | | Mix Development | 11.0 | 0.3 |
| | | | Reserved for Residential Purpose | 157.1 | 3.9 |
| | **Total** | | | **928.6** | **23.3** |
| | **Commercial** | **Commercial** | Low Density Commercial | 24.9 | 0.6 |
| | | | Medium Density Commercial | 15.4 | 0.4 |
| | | | High Density Commercial | 15.5 | 0.4 |
| | **Total** | | | **55.8** | **1.4** |
| | **Parks and Playground** | **Parks and Playground** | Parks and Playgrounds | 8.6 | 0.2 |
| | **Total** | | | **8.6** | **0.2** |
| | Amenities | Institutional | Education | 44.8 | 1.1 |
| | | | Public Administration | 32.7 | 0.8 |
| | | | Health and Welfare | 12.8 | 0.3 |
| | | | Religious | 10.1 | 0.3 |
| | | Utilities and Municipal Service Facilities | Electricity | 3.8 | 0.1 |
| | | | Sewerage | 2.0 | 0.0 |
| | | | Communication | 0.3 | 0.0 |
| | | | Water Supply | 4.1 | 0.1 |
| | | Burial Ground | Burial Ground | 53.8 | 1.3 |
| | **Total** | | | **164.4** | **4.1** |
| | Industrial | Manufacturing | Small-Scale Manufacturing/ Light Industry | 25.3 | 0.6 |
| | | | Large-Scale Manufacturing/ Heavy Industry | 85.0 | 2.1 |
| | **Total** | | | **110.3** | **2.8** |
| | Transportation | Transportation | Transportation | 196.03 | 4.9 |
| | **Total** | | | **196.0** | **4.9** |
| | **Sub Total** | | | **1463.7** | **36.7** |
| **NON-URBAN** | Agriculture and Forestry | | Agricultural | 1580.1 | 39.6 |
| | Water Bodies | | Canal | 110.1 | 2.8 |
| | | | Water Bodies | 214.9 | 5.4 |
| | Vacant Area | | | 624.0 | 15.6 |
| | **Total** | | | **2529.1** | **63.3** |
| **GRAND TOTAL** | | | | **3992.8** | **100.0** |

## 2.4 Existing Zonal Plan:

**Zone 1:**

This zone lies in the center and bounded by the Phuleli Canal, Mirpur Bathoro Road and Railway Track. The Phuleli, College and Mulakatiar Roads are passing through the zone. Most of the commercial activities are happening in this zone. The main landmarks are railway station, DHQ Hospital, Mir Ghulam Ali Talpur Park, Post Office, Press Club, Police Station, SSP Office etc.

**Zone 2:**

This zone is in south east direction in between Phuleli Canal and Laakhaat Road. Shiv Mandir, Holy Family School and Church, Govt. Boys High School are major features. Other than these, this zone if full of rich agricultural fields and a waste water lagoon.

**Zone 3:**

Zone 2 has more new development trends, situated in the north along Hyderabad Badin Road. NICVD Hospital, Indus Medical College, Session Court, DC Office, Shaheed Benazir Bhutto Park are major landmarks of the zone.

**Zone 4:**

This zone is in between Mulakatiar Road and Phuleli Canal. New housing development with rich agricultural area are also present here. In also include SMBBT TMK, low income housing scheme.

**Zone 5:**

It is an industrial zone, lies in south side in between Laakhaat and Mulakatiar Roads. The main industries are Fuji Sugar Mills and United Cotton Ginning and Oil Mills. It also include industrial housing colonies like C & D Tap Colonies.

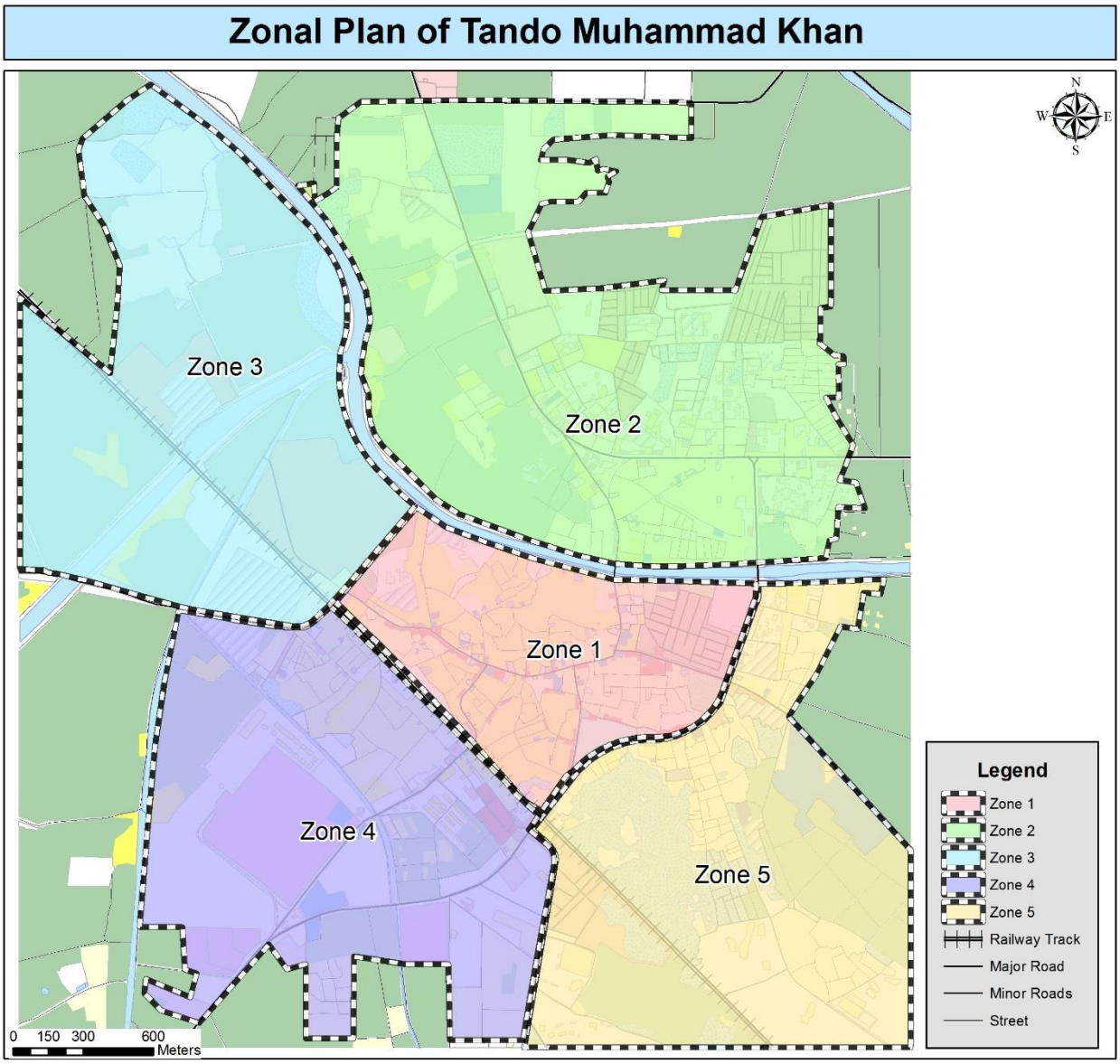



**Figure 2:5: Existing Zonal Map**

# 3. VISION FOR STRATEGIC DEVELOPMENT PLAN OF TANDO MUHAMMAD KHAN

Having gone through a detailed process of data collection and evaluation in the previous stages of the study and obtaining citizens input through the Consultative workshops with the stakeholders, the Consultants have identified development issues in the various sectors and provided sector wise strategies to resolve issues in an integrated manner. The issues are running of the development programmes. As funds are never unlimited, it would be utmost necessary to concentrate on projects that being meaningful and quick relief in the life of common man and significantly the quality of life. In the sections of the Report to follow, sector wise development strategies are listed. The focus should be to select projects which have a strong sequential links is the form of a "package" rather than stand-alone project.

The basic aim of vision formulation exercise is to have pluralistic approach to establish a shared and common vision for the development of Tando Muhammad Khan DHQ town in the future, define its role as a leading regional centre in the Sindh province and the socio-economic uplift of the population.

For Vision Formulation, a Consultative workshop was held in Hyderabad (Divisional Headquarter) at Indus Hotel on November 07, 2018 in coordination with Directorate of Urban Policy & Strategic Planning (DUP&SP) Planning & Development Department Government of Sindh.

## 3.1 Summation of Vision Formulation

The summations and conclusions are described hereunder:

1) Although the participants generally understood that vision should reflect citizens and stakeholders' aspirations as to where they want to see their town in twenty years from now. However, their focus has been remained on the resolution of immediate problems namely; supply of clean drinking water, sewerage and drainage, solid waste disposal, traffic congestion and parking, better health and educational facilities, cleanliness, parks and play areas. It is clear that far flung high sounding vision statements, are meaning less for them if the immediate problems are not urgently solved.
2) The participants showed concern regarding high rate of population growth and migration. Urbanization and uncontrolled land use conversion is eating away lots of urban agricultural land and breaking social fabric of residential communities. Need for land management system has been stressed.

3) The socio- economic uplift of the population has been mentioned by most participants, which include provision of basic needs of housing facilities with sustainable utility services, health, education, parks and playgrounds, employment and income generation.
4) Peace, safety, security and proper governance are envisioned by the participants as the ultimate goal for the twenty year Tando Mohammad Khan's Strategic Development Plan. Whereas the Vision will remain static, the path to reach the vision may be subject to adjustments to account for ground realities.

## 3.2 Tando Mohammad Khan's Vision Statement

The visioning process stems from the Stakeholders' Vision of the town which have been translated into tangible and concrete targets. The discussions in the Workshop that most people want to see:

*Where a lot of investment is expected to be made;*
***The priority will first be given to improve the Core Urban Area of DHQ town. And then could go to remaining town and Peri-urban areas.***

***Existing utilities including water supply, sewerage & drainage as well as facilities are in bad state of repairs due to shortage of funds. The government should make sufficient fund allocations for the repairs and rehabilitation of existing facilities.***

**TANDO MOHAMMAD KHAN VISION 2037**

**"The city full filling all the basic needs, such as housing, water supply and sanitation, in clean and sustainable pollution free environment, with education and health for all, along with growth in local and regional economy with increase in employment, incomes and related skills development to emerge as well planned modern city with peace, security and prosperity like some of the best most liveable cities in the world."**

# ROPOSED MASTER PLAN OF

## TANDO MUHAMMAD KHAN TOWN

# 4. PROPOSED MASTER PLAN OF TANDO MUHAMMAD KHAN TOWN

## 4.1 Spatial Pattern

Tando Muhammad khan is the headquarter town of district Tando Muhammad khan. TMK derives its name from Mir Mohammad Khan Talpur who was a famous personality in the history of Anglo-Pakistan. District Tando Muhammad Khan is famous for the making of well-known cultural symbols of Sindh such as "AJRAK", "Farasi" & "Kaashi".

Tando Muhammad Khan is primarily an agro-based district where the industrial base is dependent on agricultural production, mainly sugar-cane, which is one of the reason that this district has four major Sugar Mills of Sindh province. In this district, wheat and rice are also major crops. District Tando Muhammad Khan has a well-established irrigation system. The names of main canals and branches are Phuleli Canal, Akram Wah, Pandi Wah and Guni Wah.

The district Tando Muhammad Khan is located at 25° 8′ N and 68° 32′ E at an elevation of 11 meters on the right bank of Phuleli canal at a distance of 21 miles from Hyderabad. The topography of TMK is plain with an average elevation of about 11-meter feet above mean sea level. The land of TMK is very fertile because it constitutes the rich alluvial deposits of river Indus. The area is part of the southern Indus Basin, which is situated at the south of the Sukkur rift. The area's geology is primarily composed of sedimentary rocks.

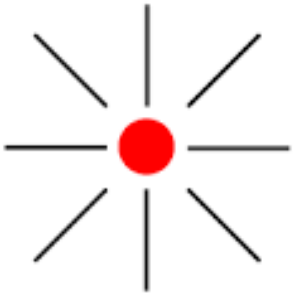
There are some important and famous places in Tando Muhammad Khan like; Shahjahan Mosque, Sudhorol Ja Thul, Mir Ghulam Ali Khan Talpur Municipal Park, Shaheed Benazir Bhutto Park, Maqbara Mir Muhammad Khan, Birth Place of Birbal etc. It also includes number of other Shrines and Darghas**.**

Although there is no national highway passing through this district, yet the provincial highways provide effective connectivity with the district. TMK is connected to Tando Allahyar Road through Tando Allahyar Road to its northeast direction whereas it is connected with Hyderabad and Badin in northwest and southeast direction respectively via Hyderabad Badin Road. It is also connected with its taluka headquarters of Bulri Shah Karim and Tando Ghulam Hyder through metaled roads. The other known roads are Mirpur Bathoro in southwest, Mulakatiar Road in west, Laakhaat Road in south and Matli Road in southeast.

The historical growth of town is mainly along the Phuleli Canal and Hyderabad-Badin Road. Tando Muhammad Khan was developed as a combination of linear and concentric town with different locations of services and use of facilities. Tando Muhammad Khan Town is observing fragmentation and is being divided into large parcels bifurcated by regional interconnected roads and water canals crossing-by town. This town can be developed as a regional center of agricultural and industrial activities due to its locational advantage and rich irrigation system in lower Sindh. Mostly town seems to be sprawling in three directions, i.e. north, west and south, but the pace is slow.

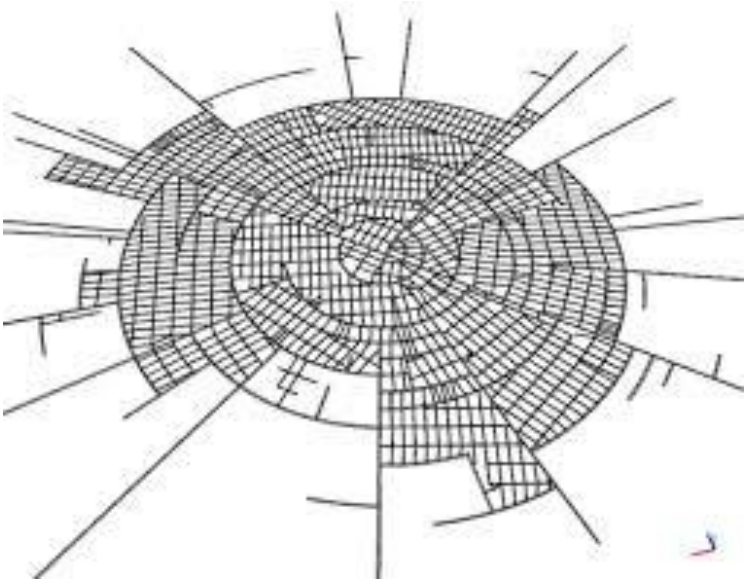
## 4.2 Basic Urban Form

The existing town is a small size lively and thriving urban center that fulfils the socio-economic and financial needs of its population and of surrounding towns. Specially those are not along major connectivity corridors are benefited, like Bulri Shah Karim and Tando Ghulam Hyder Talukas.



It is no surprise then that the population demands the uniqueness and prominence of the existing town to be maintained or enhanced in the future plan. During the stakeholder's conference, the town elders insisted that any future urban development detached from the existing town making the existing town a redundant, will not be acceptable to them.

The existing core town would naturally be the physical nucleus of the future town, and the future development will radiate from it in all directions in form of different sectors.



At present six major roads including Hyderabad – Badin Road connects TMK with the Hyderabad and Badin Towns. Most of these roads are converging on the town center and Tando Muhammad Khan Bypass is passing in northeast. The unplanned development is spreading along Hyderabad and Mirpur Bathoro Roads. Thus a Southern Bypass is proposed starting from Badin Road and ending at Mulakatiar Road, around the existing town. And in addition interconnection of the radiating roads with the proposed Ring Road around the proposed master plan, will keeps the development compact.

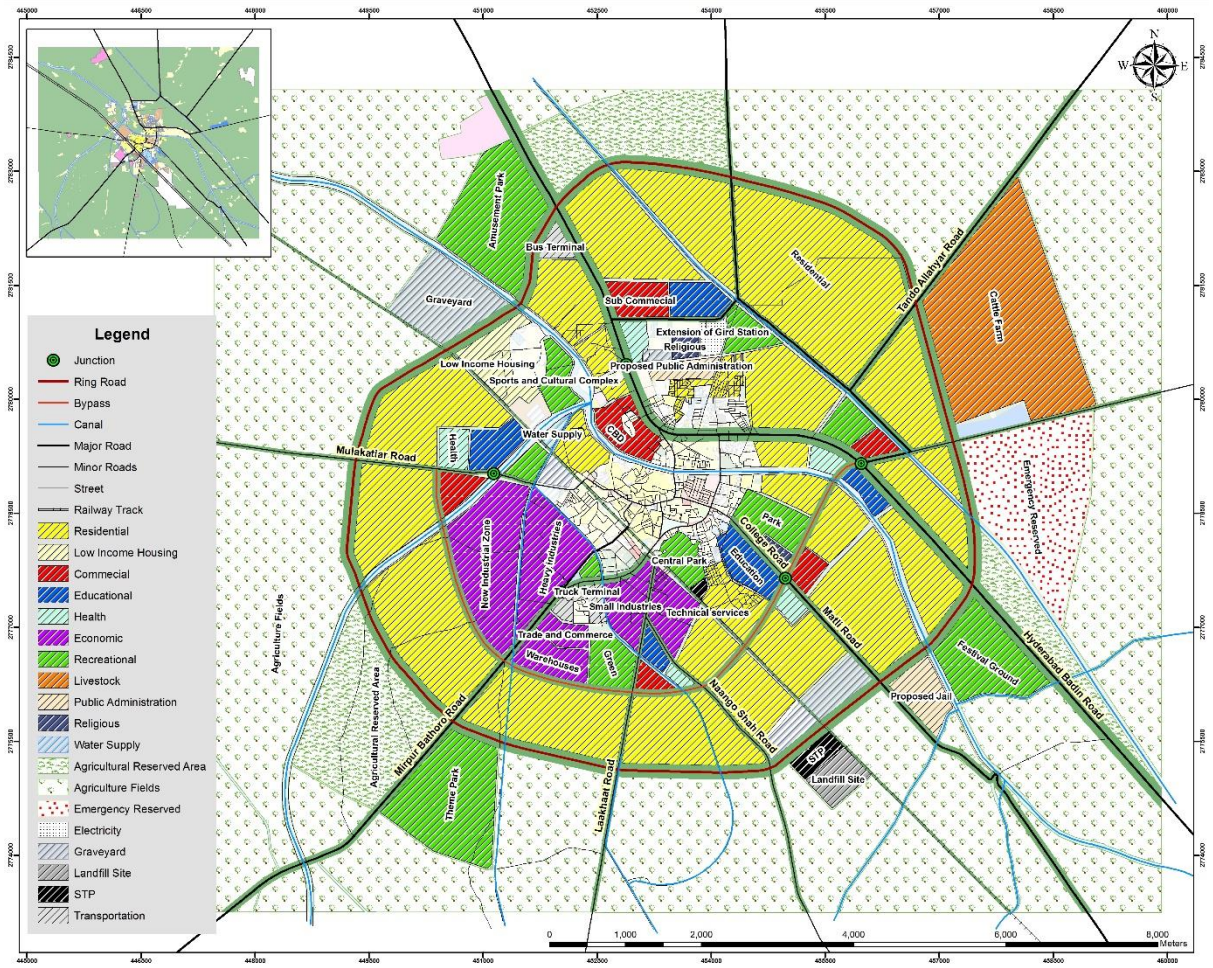
Since this town is not large enough in terms of its spatial spread then its projected future population, thus the alignment of Southern Bypass and Ring Road are made. The proposed Southern Bypass is U-shaped as it is basically formed by connecting existing spatial pattern. The proposed ring road is exactly not in a circular form, as it is shaped considering the area for further development. In addition, existing TMK Bypass is serving as a Northern Bypass, an important artery in between Hyderabad-Badin and Tando Allahyar Roads.

## 4.3 Proposed Master Plan

The Proposed Master Plan for Tando Muhammad Khan has been prepared with the consideration of three phases as follows:

i. Immediate Phase - Immediate Action Plan
ii. Short Term Phase - Priority Projects
iii. Long Term Phase – Strategic Development Plan

**Proposed Master Plan for Tando Muhammad Khan Town**




The total extent of the area included in the overall proposed Tando Muhammad Khan Master Plan is 15,100 acres approx. for a population of 162,400 by 2037. In this way, Tando Muhammad Khan Town in next twenty years is expected to have population density of 11 persons per acre and overall twelve housing units per acre with an average household size of 5.0.

The hallmark of the plan is that it is **compact without being congested**. As the future expansion of the Tando Muhammad Khan Town is expected to be large, thus the complete Proposed Tando Muhammad

Khan Master Plan is catering for all the needs of a full-fledged metropolis of the future. Thus the plan will afford balanced development containing all required land uses.

The overall structure of the plan is circular in shape, approximately with three parallel spines i.e. Hyderabad Badin Road, Phuleli Canal and Railway Lines. The New CBD has been designated in between Hyderabad – Badin Road and Phuleli Canal. The other prime activities are placed around the existing town, with two bypasses and a ring road in circular form. First bypass is Northern Bypass (existing TMK Bypass) and second is newly proposed Southern Bypass, around existing spatial spread with centrally placed activities. The propose Ring Road is running all around the further development, irrigated land and periphery. Furthermore, five sub centers are placed at the intersection of bypasses and radial roads. Thus the intersection of radial roads and bypasses will also create main junctions and forming different sectors.

Despite taking different aspects in to consideration, the Consultant suggest that the Master Planning should be reviewed every five years to estimate the land use and area requirement according to the growth rate and economic investment.

### *4.3.1* Salient Features of Planning

- As the town is not in complete circular shape, there is a main CBD (Central Business Districts) with tourism occurs in slightly in northwest side of the town.
- In addition, sub commercial areas are also identified to reduce the burden over the main CBD at; Northern Bypass, Tando Allahyar, Matli, Laakhaat and Mulakatiar Roads.
- Considering location of Mirpur Bathoro Road and existing industries; Trade and Commerce and Warehouses are placed along its one side. Moreover a much larger area for Industrial activities is proposed on other side of Mirpur Bathoro Road.
- Two transport hubs are designated; one is for public transport along Hyderabad Road in northwestern direction and other is truck terminal along Mirpur Bathoro Road in southwestern side.
- The areas for graveyards have also been reserved at far northwestern and southeastern ends of the proposed town. However, these are accessible from Ring Road and as well as from the road along Railway Line.
- The cattle and poultry areas are also proposed in the northeastern direction, accessible from Tando Allahyar Road, to limit the town development further. It will also benefit the population of nearby villages and other settlements.
- Instead of large health and educational zones, with sub commercial centers, health and educational facilities are also suggested.
- On the other side of Phuleli Canal, opposite to CBD; Sports and Cultural Complex is proposed. And along road next to railway line, a Central Park is proposed. Further three large recreational zones are placed along Mirpur Bathoro, Hyderabad and Badin Roads.

- The extension of public administration area, behind the existing District Offices along Hyderabad Road is proposed to serve and manage this beautiful city of TMK.
- Along Hyderabad, Badin and Mirpur Bathoro Roads, the areas have been reserved for agriculture after the Ring Road, as these areas are benefitted with the existing irrigation network. This will be helpful in restricting housing development and preserving the agricultural farms from the onslaught of the housing projects by private sectors.

### *4.3.2* Ring Road with Northern and Southern Bypasses – Connecting Existing with Outer Developments

i. Ring Road: The proposed Ring Road is more of a circular shape. It is placed considering the starting point of a major road under construction in between Hyderabad Road and Phuleli Canal. After Ring Road, in order to limit the physical extent of the town along Hyderabad, Badin, Tando Allahyar and Mirpur Bathoro Roads, the recreational, graveyard, jail, cattle park, agricultural and emergency reserved areas are proposed.
ii. Northern Bypass: The existing TMK Bypass is termed as Northern Bypass. This bypass is already providing connectivity to TMK from Tando Fazal, Tando Allahyar and Phalkara Roads. It starts from Hyderabad Road near Indus Hospital and end at Ayoob Kandra Chowk at Badin Road.
iii. Southern Bypass: Considering the need of connectivity among radial roads and to Hyderabad Badin Road, the Southern Bypass is proposed. The beauty of this bypass that it provide links among Matli, Mulakatiar, Laakhaat, Mirpur Bathoro and to northern bypass.

The recommendations are to increase the right of way i.e. 200 feet with urban forestation of 200 feet wide on both sides of the complete ring road. As the areas on both sides of the Ring Road will attract many developers. The land two hundred feet on both sides of the ring road should be notified for development control where only planting of local trees should be allowed.

For Bypasses, it is suggested to increase the right of way i.e. 150 feet with urban forestation of 100 feet wide on both sides of the Northern and Southern Bypasses. As the areas on both sides of the bypasses will attract many developers. The land hundred feet on both sides of the both bypasses should be notified for development control where only planting of local trees should be allowed.

### *4.3.3* Radial Roads – Regional Connectivity

All proposed radial roads are existing major roads, providing transport connectivity with other urban and rural regional areas. Most of these roads are converging to core urban area, or in other words these roads are originating from the existing town. In this way, the existing town will remain focal point of all development along the roads. However, these roads are also serving as vital radial regional connections.

As a result, there are ten proposed radial roads with increased ROW, which will serve as future regional connections. These roads includes; Hyderabad, Badin, Tando Allahyar, Mirpur Bathoro, Mulakatiar, Laakhaat, Matli, Tando Fazal, Phulkara and Naango Shah Roads. However it is very important to control upfront development along the major roads. Likewise Northern and Southern Bypasses, on both sides of major roads planting of local trees is also highly recommended.

## 4.4 Proposed Land Use Zoning

The proposed land use zoning is broadly based on NRM Standards[7]. The NRM has not been revised since decades, thus the Consultant have added new land uses in the prescribed categories, as primary zoning i.e. Level-1. Further, as per the contextual requirement of the local environment of Tando Muhammad Khan as DHQ Town, secondary zoning i.e. Level-2, is also categorized accordingly, again in consideration to the NRM Standards[8]. The proposed land use zoning is shown in the table:

| S.No | NRM STANDARDS | | PROPOSED LAND USE CLASSIFICATION | | |
|---|---|---|---|---|---|
| | Land Use Zoning | Land Uses (%) | Level - 1 Functional Zoning | Areas (acres approx.) | Land Uses (%) |
| 1 | Residential | 40-45% | Residential | 5,581 | 36.8% |
| 2 | Commercial | 2-3% | Commercial | 391 | 2.6% |
| 3 | Industrial | 2-10% | Economic | 1,798 | 11.9% |
| | | | Livestock | | |
| | | | Industrial | | |
| 4 | Institutional | 3-5% | Health and Welfare | 837 | 5.5% |
| | | | Educational | | |
| | | | Religious | | |
| | | | Public Administration | | |
| 5 | Community Open Spaces | 4-6% | Recreational | 1,651 | 10.9% |
| 6 | Graveyards | 2-3% | Graveyards | 445 | 2.9% |
| 7 | Arterial Circulation & Terminals | 15-20% | Transportation | 1,243 | 8.2% |
| | | | Utilities and Services | | |
| 8 | Protected Reserved | 15-25% | Urban Forestation | 3,205 | 21.2% |
| | | | Agriculture | | |
| | | | Water Bodies | | |
| | | | Vacant / Reserved | | |
| | Total Area of Proposed Master Plan of TMK Town | | | 15,150 | 100% |

[7] Guidelines for Land Allocation to Zones in the Preliminary Design of a New Town, Table 10.3, page no. 305, National Reference Manual on Planning and Infrastructure Standards

[8] Standard Land Use Classification for Urban Jurisdictions in Pakistan, Appendix 10.1, page no. 398, National Reference Manual on Planning and Infrastructure Standards

The total area requirement for full fledge metropolis will be around 15,100 acres. As shown in the table of proposed land use classification, the percentage of residential and commercial zones are slightly lower, in comparison to the NRM standards. Since the town has a trend of medium density development, thus it is expected that most of the residential and commercial development will required less space in comparison to other towns. However, the proposed industrial area is of higher value, as it will also contain residences for labor, cottage industries, employees / staff. In this way, industrial area is sharing the residential load as well.

**Table 3-4-1: Proposed Land Use Classification for Tando Muhammad Khan**

| S.No | PROPOSED LAND USE CLASSIFICATION FOR TMK TOWN | | | | | | |
|---|---|---|---|---|---|---|---|
| | Level - 1 Functional Zoning | Level - 2 Functional Zoning | Areas (acres approx.) | | Land Uses (%) | Areas (acres approx.) | Land Uses (%) |
| 1 | Residential | Existing Residential | 929 | 5,581 | 36.8% | 5,581 | 36.8% |
| | | Proposed Residential | 4,652 | | | | |
| 2 | Commercial | Existing Commercial | 56 | 391 | 2.6% | 391 | 2.6% |
| | | New Central Business District | 92 | | | | |
| | | Commerial at Hyderabad Road | 84 | | | | |
| | | Commerial at Badin Road | 34 | | | | |
| | | Commerial at Matli Road | 42 | | | | |
| | | Commerial at Mulakatiar Road | 54 | | | | |
| | | Commerial at Laakhaat Road | 30 | | | | |
| 3 | Economic | Trade and Commerce | 49 | 263 | 1.7% | 1,798 | 11.9% |
| | | Warehouses | 106 | | | | |
| | | Technical Services | 108 | | | | |
| 4 | Livestock | Cattle Farms | 809 | 809 | 5.3% | | |
| 5 | Industrial | Small Industrial Area | 103 | 726 | 4.8% | | |
| | | Heavy Industrial Area | 243 | | | | |
| | | New Industrial Area | 380 | | | | |
| 6 | Health and Welfare | Existing Health and Welfare | 13 | 172 | 1.1% | 837 | 5.5% |
| | | Health Area at Hyderbad Road | 35 | | | | |
| | | Health Area at Badin Road | 31 | | | | |
| | | Health Area at Matli Road | 29 | | | | |
| | | Health Area at Mulakatiar Road | 49 | | | | |
| | | Health Area at Laakhaat Road | 15 | | | | |
| 7 | Educational | Existing Educational | 45 | 409 | 2.7% | | |
| | | Educational Area at Hyderabad Road | 116 | | | | |
| | | Educational Area at Badin Road | 40 | | | | |
| | | Educational Area at Matli Road | 98 | | | | |
| | | Educational Area at Mulakatiar Road | 83 | | | | |
| | | Educational Area at Laakhaat Road | 27 | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 9 | Public Administration | Existing Public Adminitration | 33 | 194 | 1.3% | | |
| | | Extension of Public Administration Area | 53 | | | | |
| | | District Jail | 108 | | | | |
| 10 | Recreational | Existing Parks and Playground | 9 | 1,651 | 10.9% | 1,651 | 10.9% |
| | | Amusement Park | 408 | | | | |
| | | Festival Grounds | 276 | | | | |
| | | Theme Park | 433 | | | | |
| | | Sports and Cultural Complex | 77 | | | | |
| | | Central Park | 67 | | | | |
| | | Recreational at Bypass Road | 65 | | | | |
| | | Recreational at Badin Road | 60 | | | | |
| | | Recreational at Matli Road | 114 | | | | |
| | | Reacreational at Laakhaat Road | 89 | | | | |
| | | Vishwanath Sports Ground at Mulakatiar Road | 38 | | | | |
| | | Green at Mirpur Bathoro Road | 13 | | | | |
| 11 | Graveyards | Existing Graveyards | 54 | 445 | 2.9% | 445 | 2.9% |
| | | Graveyard along Ring Road | 249 | | | | |
| | | Graveyards along Railway Line | 142 | | | | |
| 12 | Transportation | Existing Transportation | 196 | 1,042 | 6.9% | 1,243 | 8.2% |
| | | Public Transport Terminal at Hyderbad Road | 32 | | | | |
| | | Truck Transport Terminal at Mirpur Bathoro Road | 53 | | | | |
| | | Road Network | 760 | | | | |
| 13 | Utilities and Services | Existing Utilities and Services | 10 | 201 | 1.3% | | |
| | | Water Supply | 16 | | | | |
| | | Sewerage | 56 | | | | |
| | | Land Fill | 83 | | | | |
| | | Electricity | 36 | | | | |
| 14 | Urban Forestation | Urban Forestation | 455 | 455 | 3.0% | 3,205 | 21.2% |
| 15 | Agriculture | Agricultural Reserved | 1,438 | 1,438 | 9.5% | | |
| 16 | Water Bodies | Canals and Ponds | 608 | 608 | 4.0% | | |
| 17 | Vacant | Vacant Area | 704 | 704 | 4.6% | | |
| | | Total Area for Future Development of TMK | 15,150 | 15,150 | 100% | 15,150 | 100% |

### *4.4.1* Residential Zone

The important features of the proposed master plan is accommodation of all income groups with diverse options for housing. Therefore in total 5,600 acres of residential land use is proposed, which will create six housing units per acre on average. Thus in overall town more than 33,000 housing units are expected to be in town by 2037.

There are existing vacant land parcels in overall town, specially in northeast of the core urban area have a considerable potential of infill development for residential use. This will somehow fulfill the partial need of new migrants coming from other areas in search of better living in the immediate phase. For low income group in short term phase (priority project) land of 137 acres adjacent to SMBBT Township along Railway Line and Ring Road is proposed for medium to high density development. While for other income groups, mixed density (low, medium and high) residential areas are proposed. Moving ahead, for the long term phase, areas are also being reserved for residential development as per future requirement, which will also include apartment buildings.

The following land use division is for New Residential Schemes according to Sindh Building & Town Planning Regulations of Sindh Building Control Authority:

| New Residential Scheme [9] | | |
|---|---|---|
| **S.No.** | **Land Use** | **SBCA Standards** |
| 1 | Residential | 55% max |
| 2 | Commercial | 5% max |
| 3 | Parks | 5% min |
| 4 | Playgrounds | 5% min |
| 5 | Public Uses | 5% min |
| 6 | Educational | 3% min |
| 7 | Roads | 22% min |

The Level II secondary zoning of residential land use will be as follow:

- **Houses**
  Taking the existing trend of housing, it is recommended to concentrate more towards houses, as the cultural context favor low to medium density housing development. However, it is preferred to follow the standards and give ample spaces to neighborhood facilities as well.

The following guidelines are for houses zone development:

| Permitted Uses | Allied Permissible Uses | Prohibited Uses |
|---|---|---|
| - Houses<br>- Neighborhood level facilities like small commercial, parks, playgrounds, schools, religious, parking | - Utilities and services<br>- Road accessibility<br>- Pedestrian friendly streetscape<br>- Mixed-used structures | - Apartments<br>- Large health and educational<br>- Large commercial activities |

[9] Land Allocation for New Residential Schemes as per Sindh Building & Town Planning Regulations, Chapter 20.4.1, page no 124.

| Houses - Applicable SBCA Bylaws[10] | | | | | |
|---|---|---|---|---|---|
| **Types** | **Densities per acre** | **Plot Sizes sq.yds** | **Foot Print FP %** | **Floor Area Ratio – FAR** | **No. of Floors** |
| Low Density Houses | 50 – 100 | 1,000 or above | 40% - 45% | 1:1 | G+2 (max) |
| Medium Density Houses | 100 - 200 | 400 to 999 | 50% - 55% | 1:1 - 1:1.5 | G+2 (max) |
| High Density Houses | 200 - 300 | 120 to 399 | 65% - 75% | 1:1.8 - 1:2 | G+2 (max) |

- **Apartments**

  In TMK Town, the trend of vertical residential and commercial development, in form of apartments is already existing. Secondly, as new migrants are expected from other urban areas as well, thus there is a need to fulfill the modern residential need like apartments. On the other hand, apartments are more effective in accommodating large number of households in less acres of land due to increased density in comparison to houses. It is not necessary to build a concrete jungle, however with better design and new ideas different type of walkable as well as high rise could be made. The main focus should be to provide open and green areas as breathing spaces in between apartment buildings as per the standards.

  The following guidelines are for apartment zone development:

| Permitted Uses | Allied Permissible Uses | Prohibited Uses |
|---|---|---|
| - Apartments<br>- Designated parking areas<br>- Small commercial<br>- Parks and playgrounds<br>- Prayer areas | - Utilities and services<br>- Road accessibility<br>- Pedestrian friendly streetscape<br>- Mixed-used structures | - Large health and educational institution<br>- Large commercial activities |

| Apartments - Applicable SBCA Bylaws[11] | | | | | |
|---|---|---|---|---|---|
| **Types** | **Densities[12] per acre** | **Apartment Sizes sq.ft** | **Foot Print FP %** | **Floor Area Ratio - FAR** | **No. of Floors** |
| Low Density Apartments | 325 | 2,500 – 4,000 | 40% | 1:2.75 | G+6 (max) |
| Medium Density Apartments | 500 | 1,500 – 2,500 | 40% | 1:2.75 | G+6 (max) |
| High Density Apartments | 650 | 1,000 - 1,500 | 40% | 1:2.75 | G+6 (max) |

[10] Houses/Bungalows, Zoning Regulations / Area Standards, as per Sindh Building & Town Planning Regulations, Chapter 25.2, page no 141.
[11] Flat Sites Category, Zoning Regulations /Area Standards, as per Sindh Building & Town Planning Regulations, Chapter 25.4, page no 144.
[12] Residential Density Standards, as per Sindh Building & Town Planning Regulations, Chapter 20.3, page no 123.

### *4.4.2* Commercial Zone

This zone is mainly mixed use commercial with state of art buildings. The smart development will be preferred from medium to high density and less foot print, in order to utilize the land efficiently with sufficient open and green spaces.

The Level II secondary zoning of commercial land use will be as follow:

- **New CBD (Commercial Business District)**
  Considering the shape and growth of the town, the New CBD has been located in the area of central attraction accessible from Hyderabad Road. The main land uses of the CBD will be regional corporate headquarters, financial centers, media houses, IT / software, specialized production service and retail shopping outlets with dedicated parking and large open spaces. This will integrate a great deal of financial, business, culture, service institutions and lots of supporting facilities; such as business office buildings, large shopping malls, hotels and apartments, etc. These will be developed with perfect and convenient traffic, communications and other infrastructures, favorable economic development, environment friendly places; which are convenient for commercial activities.

  Tando Muhammad Khan and it's environ have many sites of historical significance including number of other Shrines and Darghas like; Shahjahan Mosque, Sudhorol Ja Thul, Mir Ghulam Ali Khan Talpur Municipal Park, Shaheed Benazir Bhutto Park, Maqbara Mir Muhammad Khan, Birth Place of Birbal etc. Considering the potential of tourism, the New CBD area will also accommodate convention center, expo center, hotels, shopping malls, exhibition ground, etc.

- **Sub Commercial Centers**
  In continuation to the main CBD, it is recommended to place sub commercial areas at other major intersection to share the burden of commercial activities. Thus, five sub commercial centers are proposed along Hyderabad, Matli, Badin, Mulakatiar and Laakhaat Roads to accommodate commercial facilities. Further small commercials within the residential areas will be formed for retail commercial activities of everyday goods required to fulfill the daily need of the residents.

The following guidelines are for commercial zone development:

| Permitted Uses | Allied Permissible Uses |
|---|---|
| - Corporate head office buildings, towers<br>- Huge markets, malls, outlets<br>- Large public squares and parks<br>- Dedicated parking lots / spaces | - Pedestrian friendly streetscape<br>- Mixed-used buildings<br>- Medium to High Rise Apartments<br>- Fueling stations |
| **Applicable SBCA Bylaws**[13][14] | **Prohibited Uses** |
| - Plot Sizes: 1,000 sq.yds. (min)<br>- FP: 40% - 65%<br>- FAR: 1:2.75 – 1:5.5<br>- Floors: G+6 & G+8 (max) | - Residential housing schemes<br>- Large health and educational institution |

### *4.4.3* Economic Zone

In view of contextual requirement, the emphasis is given to other economic activities also, instead of only industrial development. The main criteria is to rely on local economic potentials, which mostly related to technical service and upcoming new type of markets.

The Level II secondary zoning of economic land use will be as follow:

- **Trade and Commerce**
  In southwest side of the town along Mirpur Bathoro Roads, trade and commerce area is positioned. This will provide in and out trading activities of the region specially to other areas of the district. It will includes grains, fruit and vegetable markets, wholesale markets, slaughter house, storage areas etc.

- **Warehouses**
  The warehouses area is proposed next to trade and commerce, also accessible from Mirpur Bathoro Road. For all of these trading activities large to small scale warehouses will be required, comprises of general, bulk, liquid, dry and cold storage as well. These should be well equipped with all the required technology of good storage and management like CCTV surveillance, in and out data entry.

[13] Commercial, Zoning Regulations / Area Standards, as per Sindh Building & Town Planning Regulations, Chapter 25.3, page no 143.
[14] Flat Sites Category, Zoning Regulations /Area Standards, as per Sindh Building & Town Planning Regulations, Chapter 25.4, page no 144.

- **Technical Services**
  The technical services area is placed along Laakhaat Road opposite to Small Industrial Area. This area will provide space for technical services like mechanical workshops and spare parts (auto mobile repairing), building construction materials, home depots, furniture market, housewares, food and beverages, computer hardware etc. However with the passage of time, technological advancement and changing needs; new requirement will come up to cater to the job market through new economic opportunities and activities.

  The following guidelines are for economic zone development:

| Permitted Uses | Allied Permissible Uses |
|---|---|
| - Warehouses and Workshops<br>- Godowns and Cold Storage<br>- Trade and Commerce Areas<br>- Showrooms or Display Centers | - Mixed-used buildings<br>- Residences for workers<br>- Fueling stations |
| **Applicable SBCA Bylaws**[15] | **Prohibited Uses** |
| - Plot Sizes:<br>  ○ Small size: upto 0.5 acres<br>  ○ Medium size: 0.5 to 5 acres<br>  ○ Large size: 5 acres or above<br>- FP: 60% - 70%<br>- FAR: 1:2.5 - 1:1.5<br>- Floors: G+1 & G+2 (max) | - Private Residential housing schemes<br>- Large health and educational institution |

### *4.4.4* Livestock Zone

Since Tando Muhammad Khan is not only an agricultural and industrial town, local inhabitants rely on livestock for another source of income. In this regard livestock zone is placed in northeast direction along Tando Allahyar Road, to promote livestock production. The main emphasis is to be given to cattle production and their required facilities and services. In addition poultry is another requirement to fulfil through the livestock zone.

The Level II secondary zoning of livestock land use will be as follow:

- **Veterinary Hospital and College**
  A full-fledged veterinary hospital and college is proposed to cater to livestock health requirements and to produce more vet doctors.

[15] Industrial Areas, Zoning Regulations / Area Standards, as per Sindh Building & Town Planning Regulations, Chapter 25.6, page no 145.

- **Dairy Production**[16]
  Dairy area will be facilitated with mandi / cattle market, artificial insemination center, slaughter house, milk collection unit, chiller storage unit, fodder storage and purchase, bio gas plant etc.
- **Cattle Farms with Pasture and Grazing Lands**
  Cattle area will contain mainly cattle farms that could accommodate buffaloes, cows, sheep, goats, camel, poultry and ostrich; with pasture and grazing lands around the farms.

The following guidelines are for livestock zone development:

| Permitted Uses | Allied Permissible Uses | Prohibited Uses |
|---|---|---|
| - Cattle Farms<br>- Poultry Farms<br>- Pasture and grazing lands<br>- Slaughter Houses<br>- Dairy production<br>- Veterinary services<br>- Veterinary education and training | - Low rise ancillary structures<br>- Residences of caretakers<br>- Related commercial activities<br>- Fueling stations<br>- Godowns and cold storage<br>- Cattle market | - Other than permitted and permissible |

### *4.4.5* Industrial Zone

In order to increase employment opportunities and production activities; industrial areas need to be developed. It will create more jobs, investment options, open new markets and at the end of the day will boost the economy of the town.

The following land use division is for New Industrial Estate according to Sindh Building & Town Planning Regulations of Sindh Building Control Authority:

| New Industrial Estate [17] | | |
|---|---|---|
| **S. No.** | **Land Use** | **SBCA Standards** |
| 1 | **Industrial** | 70% max |
| 2 | **Commercial** | 1% max |
| 3 | **Parks / Playground** | 3% min |
| 4 | **Public Uses** | 6% min |
| 5 | **Roads** | 20% min |
| 6 | **Residential** | 8% min |
| No roads shall be less than 40 feet in small industries.<br>No roads shall be less than 50 feet in medium and large industries.<br>Industrial plot of 5 acres or more, residential area for labor and staff is allowed at rear. | | |

[16] Dairy Plots, Zoning Regulations / Area Standards, as per Sindh Building & Town Planning Regulations, Chapter 25.8, page no 149.
[17] Land Allocation for New Industrial Estate as per Sindh Building & Town Planning Regulations, Chapter 20.4.2, page no 124.

The Level II secondary zoning of economic land use will be as follow:

- **Small Industrial Area**

  An Artisan Colony of an acre in Naseerabad Colony already have 81 Ajrak Units. This cottage industry is one of the main source of income as most the households indulge themselves with Ajrak manufacturing industry which is the trademark of TMK district. Thus it is highly recommended to promote Ajrak production and its associated market in this area.

  In addition the cottage industries could also include handicrafts, souvenirs etc. Other than cottage Industries, the small scale industries will include flour mills, rice mills, ice factories, packaging of fruits and vegetables, feeder crops, etc.

- **Heavy Industrial Area**

  Considering the location of Fauji Sugar Mill, it is recommended to first develop its nearby area for industrial development. Since the potential of large scale industries also present in this town, not only agriculture related industries. These industries may include cotton ginning factories, fiber factories and chemical factories.

- **New Industrial Area (Reserved)**

  The New Industrial Area is proposed along Mirpur Bathoro Road, next to heavy industrial area. It is highly recommended to first filled the small industrial areas, then explore this reserved area according to the economic need of the town. This is more appropriate to develop small to medium scale industries, and avoid further development of heavy industries to keep the city environment clean. It is not suggested to develop whole area at once, instead as per the need. Preferably starting from the road accessible side and keeping further area reserved for future use when firstly developed area utilized.

The following guidelines are for industrial zone development:

| Permitted Uses | Allied Permissible Uses |
|---|---|
| - Small Scale Industries<br>- Processing Units<br>- Manufacturing Activities<br>- Warehouses or Godowns<br>- Workshops | - Showrooms<br>- Mixed-used buildings<br>- Residences for workers<br>- Fueling stations |
| **Applicable SBCA Bylaws[18]** | **Prohibited Uses** |
| - Plot Sizes:<br>  o Small size: upto 0.5 acres<br>  o Medium size: 0.5 to 5 acres<br>  o Large size: 5 acres or above<br>- FP: 60% - 70%<br>- FAR: 1:2.5 - 1:1.5<br>- Floors: G+1 & G+2 (max) | - Private Residential housing schemes<br>- Large health and educational institution |

[18] Industrial Areas, Zoning Regulations / Area Standards, as per Sindh Building & Town Planning Regulations, Chapter 25.6, page no 145.

### *4.4.6* Health and Welfare Zone

This zone is specifically for health and welfare related large scale activities. It will be a specialized area with high tech health facilities, social welfare and supporting services; with advance infrastructure. The aim will be to provide all specialized health solution within the town, and to serve the population beyond city borders, like nearby urban and rural localities.

The Level II secondary zoning of health and welfare land use will be as follow:

- **Health and Welfare Areas**
  Since DHQ Hospital is already upgraded and centrally located, thus five sub health and welfare centers are proposed along major radial roads. These health areas are marked in regards to the major radial roads and their connectivity, in order to make it accessible for other towns as well and to attract private investment in health and welfare sector. These health and welfare areas are accessible from Hyderabad, Matli, Badin, Mulakatiar and Laakhaat Roads.

  In these area it is suggested to have further extension of DHQ Hospital with Medical and Nursing Colleges, staff residence, hostels, community and allied facilities. It is widely possible that some of these areas will be utilized for distinct health and welfare facilities in long term phase; like specialized hospitals, research and welfare centers etc. These could also include; Rehabilitation Centers, Special children, Edhi Homes (orphanage / old age / women) etc. These will also comprises of the specialized units like oncology, urology, infertility centers, organ transplantation, and specialized treatment centers, research and development centers.

  The following guidelines are for health and welfare zone development:

| Permitted Uses | Allied Permissible Uses |
|---|---|
| - Large Hospitals<br>- Specialized treatment centers<br>- Medical College<br>- Dental College<br>- Pharmaceutical College<br>- Nursing College<br>- Laboratories and Diagnostic Centers<br>- Blood Banks<br>- Health Research Institutes | - Staff Residences (medical and paramedic)<br>- Separate Hostels for Boys and Girls<br>- Auditoriums, seminar halls, workshop spaces<br>- Community facilities (parks, playgrounds, schools, clinic, neighborhood commercial)<br>- Support facilities (gym, health club, bus stops, taxi stand, banks, fueling stations) |

| Applicable SBCA Bylaws[19] | Prohibited Uses |
|---|---|
| - Plot Sizes: 1.0 acre or above<br>- FP: 50%<br>- FAR: 1:1.5<br>- Floors: G+2 (max) | - Private residential housing schemes<br>- Large commercial activities |

### *4.4.7* Educational Zone

The large scale educational land uses will be development in this zone, focusing towards the global trend of education specially for upcoming generations. The aim is to create a knowledge base hub, to provide quality education in all diversified filed, in order to upgrade the livelihood of the local as well as the regional population.

The Level II secondary zoning of educational land use will be as follow:

- **Educational Areas**
  Similarly to health facilities, five educational areas are proposed along major connectivity corridors, to provide educational facilities in all zones of the town. These areas are located at TMK Bypass, Matli, Badin, Mulakatiar and Laakhaat Roads.

  One of these education areas, will mainly for the public sector general university, which is lacking in the town. The idea is to first introduce common educational fields like languages, humanities, applied sciences, arts, commerce, social sciences etc., which could be modified further. Afterwards broad-spectrum of new ranges of education will be added according to the demand of the society, in form of wings, departments and blocks.

  In addition to academic buildings; allied facilities like administration, sports grounds, and health clubs will also be accommodated here. Since it will be the primary level university of the town, thus it will also contain large number of students, faculty and staff. This huge influx will also require residences with community facilities.

  It is also proposed to provide government degree colleges for boys and girls, separately in most of these educational areas. It is suggested to accommodate all the required facilities and service like; libraries, laboratories, playgrounds, washrooms, etc. The library, data and information centers and scientific research institutes are also recommended in these areas to provide all kind of facilities for research and development in different fields.

  Some of these areas will also include; poly technical college for boys and girls, women development center (working women hostels, day care centers), certified computer and IT training centers,

[19] Amenity Plots, Zoning Regulations / Area Standards, as per Sindh Building & Town Planning Regulations, Chapter 25.5, page no 145.

research centers, etc. The vocational training centers are also suggested to be placed in some of these areas to cater need of under privileged youth for better skills and technical knowledge. This will provide space for skill development centers, technical education for the local and surrounding population to accommodate in the current job market.

As the society is moving towards global dynamics, diversified fields of education will be prerequisite. These could include upcoming need of the job market like; engineering, business, management, finance, media, IT and software, etc. The purpose behind is to involve regional level youth in the education and research, in order to enhance the educational attainment level.

The following guidelines are for educational zone development:

| Permitted Uses | Allied Permissible Uses |
|---|---|
| - Large scale educational areas<br>- General Education Universities<br>- Scientific Research Institutes<br>- Engineering colleges / universities<br>- Business and management schools<br>- Finance and accountancy Institutes<br>- IT and media Institutes<br>- City level libraries, book banks, data and information centers | - Staff Residences (teaching and non-teaching)<br>- Separate Hostels for Boys and Girls<br>- Auditoriums, seminar halls, workshop spaces<br>- Community facilities (parks, playgrounds, clinics, schools, neighborhood commercial)<br>- Support facilities (gym, health club, bus stops, taxi stand, banks, fueling stations) |
| **Applicable SBCA Bylaws[20]** | **Prohibited Uses** |
| - Plot Sizes: 1.0 acre or above<br>- FP: 50%<br>- FAR: 1:1.5<br>- Floors: G+2 (max) | - Private residential housing schemes<br>- Large commercial activities |

[20] Ibid

### *4.4.8* Religious Zone

In the proposed master plan two religious sites are allocated in the Tando Muhammad Khan Town. One is opposite to extension of Public Administration Area accessible from Hyderabad Road and other is accessible from Matli Road. These are not necessarily to be developed soon, as presently there are sufficient religious places. These will be grand religious monumental buildings and structures, to enhance aesthetic of the town. Further it is suggested to fulfill the future requirement of different religious groups in sub divisions of other areas.

The following guidelines are for religious zone development:

| Permitted Uses | Allied Permissible Uses |
|---|---|
| - Religious buildings like mosques, imam barghahs, mandir, churches, etc.<br>- Religious teaching areas<br>- Religious preaching grounds<br>- Orphanage | - Residences for religious leaders<br>- Accommodation for religious scholars, students<br>- Small parks, playgrounds, clinics, commercial<br>- Support facilities (bus stops, taxi stand, banks, fueling stations) |
| **Applicable SBCA Bylaws[21][22]** | **Prohibited Uses** |
| - Plot Sizes: 1.0 acre or above<br>- FP: 50%<br>- FAR: 1:1.5<br>- Floors: G+2 (max) | - Private residential housing schemes<br>- Large commercial activities |

### *4.4.9* Public Administration Zone

The existing offices of Public Administration are mostly along Hyderabad Road. Considering future requirements, the new public administration area is also marked behind the existing area.

The Level II secondary zoning of public administration land use will be as follow:

- **Extension of Public Administration Area**
  The public administration offices will includes District Secretariat, Development Authority, Town Committee Offices, Line Departments, Local Government Offices, Town Planning Department, Judiciary Complex, Circuit House etc.

  As Tando Muhammad Khan is a district headquarter, in future with the rising activities more space for different public offices and institutions will be required. With this assumption future extension area for public administration need to be reserved.

[21] Ibid

[22] Religious Buildings, Plots, Zoning Regulations / Area Standards, as per Sindh Building & Town Planning Regulations, Chapter 25.13, page no 156.

The area for public employee housing is also suggested here to cater the need of housing for public employees. This will include houses and walkable apartments for all employees, according to their grade levels and status.

- **District Jail Extension**
  The District Jail is proposed along Matli Road in southeast direction. This will serve the purpose of District Jail with all required needs and will also fulfill the residential requirement of the staff of various levels.

The following guidelines are for public administration zone development:

| Permitted Uses | Allied Permissible Uses |
|---|---|
| - District Secretariat,<br>- Development Authority<br>- Town Committee Complex<br>- Line Departments<br>- Local Government Offices<br>- Town Planning Department<br>- Judiciary Complex<br>- Circuit House | - Employees Residences (for all grades)<br>- Auditoriums, seminar halls, workshop spaces<br>- Community facilities (parks, playgrounds, clinics, schools, neighborhood commercial)<br>- Support facilities (gym, health club, bus stops, taxi stand, banks, fueling stations) |
| **Applicable SBCA Bylaws[23]** | **Prohibited Uses** |
| - Plot Sizes: 1.0 acre or above<br>- FP: 50%<br>- FAR: 1:1.5<br>- Floors: G+2 (max) | - Private residential housing schemes<br>- Large commercial activities |

### *4.4.10* Recreational Zone

In the existing towns, disappearance of open spaces and non-provision of planned open spaces are seen. Thus, in the proposed master plan, recreational land use has been given a vital importance in order to create a healthy environment. Several types of regional level recreational activities are recommended like sports and cultural complex, amusement and theme parks, festival grounds etc.

The Level II secondary zoning of recreational land use will be as follow:

- **Central Park**
  Along Main City Road, a large central park is proposed in the heart of the town, to utilize wetland area. This will be a general public park, however its sub portions could be reserved for

[23] Ibid

families (ladies and children). Thus it will also contain area for swings, sitting, walking, jogging with allied facilities of washrooms, tuck shops, parking etc.

- **Sports and Cultural Complex**
  In diagonal position to New CBD towards Phuleli Canal, Sports and Cultural Complex is proposed. It will include cricket, football, hockey and other ground, cultural center and gymnasium. These type of sports facilities will be as per standards to promote domestic sports.

- **Festival Grounds, Amusement and Theme Parks**
  Towards Badin Road, outside the Ring Road, an area is located for the purpose of festival grounds. Considering local tradition and types of festivals, a large space is designated for such events. These grounds will be used for large population events like carnivals, eid festivals.

  The site for amusement park is proposed in northwest direction along Hyderabad Road, outside Ring Road. In this area large scale amusement facilities like thrilling rides in a safe and pleasant manner will be provided.

  There is a large recreational area has been designated along Mirpur Bathoro Road outside the Ring Road, for future reserve. Since, theme parks like art park, ice park, floral garden, glow garden etc. could also be introduced as per the demand of the region. Moreover, TMK is a regional center there is also need to locate botanical and zoological gardens. These gardens will serve not only a metropolis of future but urban and rural areas of Tando Muhammad Khan region as well.

- **Recreational Areas**
  There are five recreational areas proposed along TMK Bypass, Badin, Matli, Mulakatiar and Laakhaat Roads. In these recreational centers; multipurpose playgrounds, orchards and family parks are proposed to place for active and passive facilities. These are ideally need to be in center of the residential areas, accessible for all.

The following guidelines are for recreational zone development:

| Permitted Uses | Allied Permissible Uses | Prohibited Uses |
|---|---|---|
| - City scale parks<br>- Large public squares<br>- Sports facilities<br>- Cultural activities<br>- Amusement area<br>- Special theme parks<br>- Regional level gardens like botanical, zoological | - Ancillary structures<br>- Accommodation for caretakers / workers<br>- Related commercial activities<br>- Fueling stations<br>- Parking<br>- Public washrooms | - Other than permitted and permissible |

### *4.4.11* Graveyards Zone

At present there are number of graveyards in the town, which have sufficient space available for immediate need. However, for long term the graveyards are proposed, one towards northwest along Ring Road and another in southwest side in between Matli and Naango Shah Roads.

These graveyards can be further divided according to the requirement of practicing religions in the town. All of these sites are approachable from existing roads and will also remain in the peripheries of the town.

The following guidelines are for graveyard zone development:

| Permitted Uses | Allied Permissible Uses | Prohibited Uses |
|---|---|---|
| - Graveyard area | - Related commercial activities<br>- Accommodation for caretaker | - Other than permitted and permissible |

### *4.4.12* Transportation Zone

In Tando Muhammad Khan Town, the transportation is mainly based on railway connectivity and road network of radial roads, bypasses, ring road with terminals and intersections. Road network is considered as a vehicle for economic development and social change. Efficient road network not only develops a quick and efficient transportation system but also opens up new areas previously remained closed. It brings about social integration among rural and urban sectors and greatly assists in providing access to basic amenities such as education, health facilities, etc. It brings rural areas in constant touch with urban segment of a society and creates better understanding necessary for social change and economic activities.

The Level II secondary zoning of transportation land use will be as follow:

- **Proposed Road Network**

  The proposed road network is originate from the existing radial roads (Hyderabad, Badin, Mirpur Bathoro, Tando Allahyar, Matli, Mulakatiar, Laakhaat, Naango Shah, Tando Fazal and Phulkara Roads) and Northern Bypass. By adding Southern Bypass the existing roads becomes major connecting corridors and Hyderabad – Badin Road still act as main spine for the TMK Town through widening and beatification.

  All proposed Major Roads (primary, secondary and tertiary roads) of the master plan will be dual carriageways with green medians in the center; as shown:

| S. No. | Major Roads | ROW (ft) | Forestation (ft) |
|---|---|---|---|
| i. | Ring Road | 200 | 200 |
| ii. | Southern Bypass | 150 | 100 |
| iii. | Northern Bypass | 150 | 100 |
| iv. | Hyderabad Road | 200 | 200 |
| v. | Badin Road | 200 | 200 |
| vi. | Mirpur Bathoro Road | 150 | 100 |
| vii. | Tando Allahyar Road | 150 | 100 |
| viii. | Matli Road | 150 | 100 |
| ix. | Mulakatiar Road | 100 | 50 |
| x. | Laakhaat Road | 100 | 50 |
| xi. | Tando Fazal Road | 100 | 50 |
| xii. | Naango Shah Road | 100 | 50 |
| xiii. | Phulkara Road | 100 | 50 |
| **ROW – property to property distance**<br>**Forestation on both side of ROW** | | | |

**Primary Roads:** The Ring Road running on the periphery of the town and Hyderabad and Badin Roads dissecting the whole town are considered as Primary Roads. Its different segments are serving as bypasses without entering in the town. It will have a right of way of 200 feet (min) with initially a four-lane divided road, service road, median, parking, and cycle/pedestrian track and local tree plantation on both sides. In addition to the 200 feet ROW, urban forestation of 200 feet on both side are also proposed, to avoid direct / upfront development along primary roads. All

primary roads crossings will be initially roundabouts with enough space for grade separated junctions in the future.

**Secondary Roads:** The secondary roads, are radial roads connecting the town with other towns and arteries connecting radial roads. It will have a right of way of 150 feet (min) with three lanes, service road, median, footpaths, parking and cycle/pedestrian tracks. These roads includes; Northern and Southern Bypasses, Tando Allahyar, Mirpur Bathoro and Matli Roads.

**Tertiary Roads:** The tertiary roads will have a right of way of 100 feet (min) with at least two lanes, median, footpaths, parking and cycle/pedestrian tracks. These roads includes; Mulakatiar, Laakhaat, Naango Shah, Tando Fazal and Phulkara Roads.

- **Public Transport Terminals**
  The public transport terminal is placed along Hyderabad Road in north, at start of Ring Road. It is proposed in order to provide better and nearby multi intermodal transport connectivity. Since major regional communication of general public is expected via these major roads; as most of residential, educational and health related traffic will be generated and these will cover most of the town. These will be comprises of the parking for public buses, hiace, wagons, taxis; with allied facilities like ticking booths, sitting / waiting areas, washrooms, shops and required residence for the drivers and staff.

- **Truck Terminals**
  Towards southwest of the town, along Mirpur Bathoro Road a truck terminal is proposed. Since from this point all industrial and economic activities are connected, it is found more appropriate location for heavy traffic and goods transport. The proposed terminal will help in transporting goods from / into the town, which will benefit and boost the economic activities of the town.

  Since Tando Muhammad Khan is a regional trading center and it would also require containers facility. It is recommended to mainly comprise of the container yards and related functional spaces. In addition required residence for the drivers and other staff with small offices, rest areas, washrooms, shops etc.

- **Railway Reserved Area**
  The town has an old Railway Station, which is linked with the national network of Pakistan Railways through Karachi railway line via Kotri-Hyderabad. It is located in middle of the town, on Hyderabad – Badin branch railway line. The railway line is coming from Hyderabad side and going towards Badin. It is suggested to reserve the area for railway use only, to avoid any sort of encroachments. Consequently, the available vacant land parcels have been marked as Railway Reserved Area, in order to avoid further violation of railway ROW. Further it is

recommended to improve the railway service for better cost effective connectivity for the town's economy.

- **Air Connectivity**
  Regarding air connectivity, TMK is directly connected to Hyderabad Airport at a distance of 34 kilometers via Hyderabad Road. Thus, it is suggested that residents of TMK Town should utilize Hyderabad Airport, as new airport for TMK is not feasible with projected population.

The following guidelines are for transport zone development:

| Permitted Uses | Allied Permissible Uses |
|---|---|
| - All types of parking areas<br>- Designated ROW<br>- Green belts<br>- Footpaths<br>- Traffic management devices | - Drivers and staff accommodation<br>- Support offices, rest areas, washrooms, shops etc.<br>- Street furniture like lights, trash bins, benches etc. |
| **Applicable SBCA Bylaws[24]** | **Prohibited Uses** |
| - No direct access to major roads will be allowed except through service road<br>- No structure or part of a structure may project beyond building line | - Any kind of encroachment |

### *4.4.13* Utilities and Services Zone

The utilities and services provision is also made in the master plan. This land provision is mainly for large scale utilities and services.

The Level II secondary zoning of utilities and services land use will be as follow:

- **Water Supply**
  The main water supply sources is Phuleli Canal, from which water is supplied to TMK Town. In continuation of existing water supply network, an area near Pandi Wah along Phuleli Canal is suggested for water supply works. This additional area has been reserved to extend the water reservoirs as per the town's water demand and related water supply infrastructure. This increase will also cater to water supply filtration plant and other advance purification mechanism.

[24] Highway Major Roads, General Standards, as per Sindh Building & Town Planning Regulations, Chapter 21, page no 126.

- **Sewage Treatment Plant**
  The area is designated for STP and its related uses, along Railway Line in southeast direction accessible from Ring Road. The site is low in elevation level with respect to nearby main drain, which will helpful to relay mainly on gravity flow. From very first it is not necessary to setup a fully mechanized STP, but it is suggested to start with oxidation ponds then proceed toward advance management of waste water.

- **Landfill Site**
  A landfill site is proposed at outskirts of the town, in southeast side considering wind direction. This landfill site is next to STP and accessible from Ring Road. As the whole town will grow according to the master plan it will serve the population for next 20 years or even beyond.

- **Grid Station**
  Grid station in TMK Town is existing and accessible from Hyderabad Road. Its extension for immediate need is possible to some extent within the same premises. However, new facility for electrification will be required for this town. This new extended facility will benefit the residents as per the need of the present consumption of the town. However the new area for grid station setup with upcoming future load and requirement, is suggested along Northern Bypass in northeast direction.

The following guidelines are for utilities and services zone development:

| Permitted Uses | Allied Permissible Uses | Prohibited Uses |
|---|---|---|
| - Land use for Utilities and Services like Water Supply, Filtration, Oxidation Ponds, Sewage Treatment, Landfill Sites, Grid Station etc. | - Related land development and building activities<br>- Accommodation for staff, operators and labors.<br>- Specific parking area. | - Other than permitted and permissible |

### *4.4.14* Urban Forestation Zone

Urban forestation along Ring Road and Hyderabad – Badin Road is proposed to avoid rapidly increasing disorganized private development. Instead planned residential areas as per building control rules and regulations which are proposed on both sides of road after urban forestation reserved areas. In order to protect Ring Road from uncontrolled development, urban forestation of two hundred feet at both sides of the road should be planted. It is advised to restrict development in this area and implement the rules and regulations to keep the town green.

In addition to Ring Road urban forestation of 50 to 100 feet on both side of the major roads and both bypasses are also proposed depending upon their ROW, to avoid direct / upfront development along roads. All major roads crossings will have initially green roundabouts with enough space for grade separated

junctions in the future. It is recommended to plant locally available species for urban forestation. This region is gifted with a large variety of natural vegetation of grasses, shrubs and trees.
The following guidelines are for urban forestation zone development:

| Permitted Uses | Allied Permissible Uses |
|---|---|
| - Land use for horticulture, landscaping, plantation, green belt, forestation. | - Related land use and activities, while no land development or buildings.<br>- Temporary accommodation for labor and security persons.<br>- Specific parking area for any accident and unplanned incident. |

### *4.4.15* Agricultural Zone

In order to limit the town development agricultural reserved areas are proposed along Ring Road specially along Hyderabad, Badin and Mirpur Bathoro Roads. In this manner not only town spatial growth will be confined but also essence of agriculture activities will remain close to the town. It will also create a healthy environment and less burden will be on spread of infrastructure network. The existing villages or settlements in the periphery of the town will also be benefited and not removed from their place of livelihood.

The recommended crops for production are; sugarcane, rice, wheat, rapeseed and mustard, cotton, jowar, maize, gram, and barley. Due to its soil and topography, TMK is an ideal place for sugarcane cultivation. In addition to these, fruit orchards are also found in this district.

The following guidelines are for agriculture zone development:

| Permitted Uses | Allied Permissible Uses |
|---|---|
| - Land use for proposed agricultural and its necessities. | - Related land activities with respect to its rules and regulations.<br>- Accommodation for farmers and labor in associations with MC. |

### *4.4.16* Water Bodies

In Tando Muhammad Khan, the main water source is Phuleli Canal and its branches are Pandi Wah, Akram Wah and Guni Wah. Therefore, it is suggested to protect nearby water courses like Phuleli Canal and its branches and their beautification is highly recommended. It includes:

- Protection of its right of way and removal of encroachments
- Control on incompatible development in its surrounding
- Restriction on disposal of waste water
- Restriction on dumping of solid waste

- Provision of roads on both sides of its course
- Native plantation on both sides of its course

The following guidelines are for Water Bodies zone development:

| Permitted Uses | Allied Permissible Uses |
|---|---|
| - Land use for water bodies like rivers, tributaries, canals, water channels, irrigation network, ponds, lakes, water courses. | - Related land use and activities, while no land development or buildings.<br>- Temporary accommodation for labor and security persons. |

### *4.4.17* Vacant Zone

The objective of providing vacant area is to cater the emergency need at time of any disaster. With this respect areas outside the town limit will kept reserved for emergency need, which could be utilized for portable homes, mobile health care facilities, camping for vulnerable of calamities, temporary storage of bulk material etc. The proposed vacant area is within the Tando Muhammad Khan Town but being on the peripheral area, would not disturb the town activities in general and it is directly accessible from Phulkara Road and Ring Road.

However, the control on vacant land is extremely important, leap-frog development create pressure to utilize for other uses. Thus, there is a need to make sure that no development would take place in these types of reserved areas.

The following guidelines are for vacant zone development:

| Permitted Uses | Allied Permissible Uses |
|---|---|
| - Land use for proposed emergency and imminent necessities | - Related land development and building activities.<br>- Temporary accommodation for operation and maintenance staff in associations with MC. |

# SECTOR WISE PROPOSED STRATEGIES

# 5. HOUSING

Adequate housing is fundamental to improve living standards among poor and low-income households because it is one of the major components of social infrastructure, the lack of which begins to offset the positive effects of economic development. Without adequate shelter, families are condemned to poverty, poor health, low educational attainment, vulnerability to natural disasters and chaos of civil conflict. Lack of safe, affordable, decent housing is a major contributor to poverty and affects all aspects of a family and community's life.

The existing housing situation in Tando Muhammad Khan is not much different from the national scenario. However, it is observed that its severity is not as high as in other towns as its growth rate is reducing due to lack of economic activities which promotes migration. Significant percentage of the urban population and majority of the rural migrants live in appalling living conditions.

## 5.1 Existing Situation

The sample survey identified that 19% of houses are Katcha, 44% are Pacca, 24% of houses were RCC construction, and semi pacca houses were only 13%. The age of house construction as per respondents that 17% of houses were constructed up to 5 years, while 20% of responded claimed that their houses were construct up to 10 years, up to 20 years 25%, upto 30 years 14% and above 31 years 23%.

- **Family Structure of Household**

  The results of the Socio-economic survey conducted by the consultants' reveals 31% of surveyed houses consist of 5 to 6 family members. Tando Muhammad Khan town has a high population density due to commercial activities. Furthermore, 25% of the surveyed households consist of 3 to 4 members and 20% of the households consist of 7 to 8 members and 11% of the households consist of 9 to 10 members.
  The sample survey conducted by the consultants bought us to a conclusion that the gender distribution of Tando Muhammad Khan is 42% female and 58% are male.

- **House Ownership**

  According to the primary survey conducted in Tando Muhammad Khan town. The status of ownership of houses is like 81% family-owned, 2% rent-free and 13% on rent. The category of rental indicates the housing gap. The rent range up to Rs. 5000/- is 76% out of rental houses and rent of between Rs.5001/- to Rs.10, 000/- is 24%.

- **Years of Construction**

  The results of the conducted survey by the consultants that the city has new and intermediate construction (06 – 10 years and 11 – 20 years) respectively.

- **Number of Rooms**

  There are indications of housing congestions as 48% of the houses have two rooms or less, and 23% of the houses have three rooms while the remaining 29% have more than three rooms.

- **Utility Service Availability In House**
  - The piped water supply is available to only 41% of the respondent, while 42% of the respondents have hand pumps inside their house.
  - 100% of the respondents had facilities of toilets inside their houses and mostly connected to drained (flush system).
  - 100% of the respondents had Facility of Kitchen inside their houses and mostly the Kitchen drain is directly connected to open surface drain system.
  - The electricity is available to 100% of the respondent that shows the almost the entire city has access to electric power.
  - The gas supply is accessible to only 71% of the responding households, while the remaining might be using some other alternate sources i.e. coal, wood, and LPG, etc.

### 5.2 Katchi Abadis

In urban areas, the problem manifests as unstoppable growth of squatter settlements known as katchi abadis and encroachment of state and private land. It is estimated that 50% of the urban population now lives in katchi abadis and informal settlements.

### 5.3 Katchi Abadis of Tando Muhammad Khan DHQ Town

According to data provided by Sindh Kacthi Abadis Authority (SKAA), that eight sites are identified as Katchi Abadis in TM Khan Town, namely ; Shaukat Colony, Soomra Village Colony, Talpur Colony Jagir Barhiyar Mohallah, Behrani Mohallah, Mustraqa Colony and Near Shaukat Colony. Out of total five katchi abadi sites are un-notified and three notified. These eight sites are covering an area of 96.93 acres with 2,125 housing units (approx. 14,426 population). It is estimated that 14.16% population of TM Khan MC resides in katchi abadis.

**List of Katchi Abadis in Tando Muhammad Khan DHQ Town**

| S. NO. | Name of Katchi Abadi | Total Area in (Acres) | No. of Housing Units | Estimated Population | Date of Notification |
|---|---|---|---|---|---|
| 1 | S.NO.47 Shaukat Colony 42-47 | 23.15 | 403 | 3474 | Un-Notified |
| 2 | Soomra Village | 9.00 | 200 | 1350 | 02-12-1991 |
| 3 | S.NO.48 TO 58 & 326, 332 | 26.00 | 500 | 3900 | Un-Notified |
| 4 | Talpur Colony S.NO. 25-38 & 52 | 31.00 | 800 | 4650 | Un-Notified |
| 5 | S.NO. 69 Jagir Barhiyar Mohallah | 1.27 | 47 | 42 | Un-Notified |
| 6 | S.NO.30 Behrani Mohallah | 1.19 | 45 | 180 | 02-12-1991 |
| 7 | S.NO.325 Mustraqa Colony | 3.00 | 50 | 350 | Un-Notified |
| 8 | S.NO.417 Near Shaukat Colony 80 (FAMIS) | 2.32 | 80 | 480 | 02-12-1991 |
| **Total** | | **96.93** | **2,125.00** | **14,426.00** | |

### 5.4 Available Housing Stock

As per 2017 census population results, Tando Muhammad Khan municipal area had a household size of 5.0 persons and total housing stock of 20,536 households, Most of them were categorized as Pacca houses which include Pacca (Brick construction) and RCC houses.

**Table 5-1: Housing Statistics**

| Administration Unit | Past Census 1998 | | | | Current Census 2017 | | | |
|---|---|---|---|---|---|---|---|---|
| | Population | AGR | No. of HHs | HH Size | Population | AGR | No. of HHs | HH Size |
| Tando Muhammad Khan MC | 65,396 | 2.67% | 8,958 | 7.3 | 101,863 | 2.36% | 20,536 | 5.0 |
| Tando Muhammad Khan Taluka | 166,190 | 2.13% | 33,238 | 5 | 255,662 | 2.29% | 50,769 | 5.0 |
| Tando Muhammad Khan District | 438,624 | 2.31% | 86,004 | 5.1 | 677,228 | 2.31% | 131,565 | 5.1 |

**Shaheed Mohtarma Benazir Bhutto Township (SMBBT)**

Government of Sindh included the scheme under Special Initiative Unit in its Annual Development Plan 2011-12 i.e. "Development of Townships in Major Urban Centers (50,000 Nos.) 120-Sqyds plots with all Civic Services" under President's Directives.

The site of SMBBT in TMK is closed to the crossing of canal with railway line. The site has been fully developed with 359 plots ready for allotments to poorest of society.

### 5.5 Issues

The following are the generalized and specific issues of the housing sector as noted in case of Tando Muhammad Khan:

- Low public confidence in the housing development industry.
- The Tando Muhammad Khan MC lacks required skills to effectively manage the urban growth, provide basic utility services and maintain the infrastructure, especially in low income areas.
- Lack of comprehensive planning at local level without effective co-ordination among various Government departments, development agencies and other bodies has impeded housing development.
- As per statistics of District Census report of Hyderabad 1998, housing backlog in Tando Muhammad Khan TC was just 36 which is one of the causes that housing needs are less and private housing schemes are not being functional / occupied properly.

- Housing and other basic civic services are generally sub-standard in Tando Muhammad Khan. The problem could be multiplied with increase of population in urban areas by providing reputable and profitable earning sources.
- Land is becoming scarce within cities. This has constrained the growth of private sector housing.
- The situation is worse for low income groups.

## 5.6 SWOT Analysis

| HOUSING | | | |
|---|---|---|---|
| **Strength** | **Weakness** | **Opportunity** | **Threats** |
| 1. The trend of new housing schemes construction by private development is increasing.<br>2. Most of the formal population is served by electric and gas supply. | 1. Half of the urban town population lives in katcha houses where quality of life is low and utility services are limited.<br>2. High prices of houses.<br>3. The informal housing sector lacks provision of utility services like gas supply, clean water and drainage facilities. | 1. Demand for new planned housing schemes.<br>2. Demand for low income housing.<br>3. Demand for public housing projects.<br>4. More housing for local people of town.<br>5. Opportunity for local micro financing for housing.<br>6. Installation of basic utility services through new projects | 1. Homelessness.<br>2. High housing prices and rents.<br>3. Development of informal housing in empty/vacant spaces available within town.<br>4. Increase to urban sprawl.<br>5. Inflation to land leads to inflation.<br>6. Shortage of open spaces in urban areas.<br>7. Formation of urban slums.<br>8. Relocation of higher income groups to other towns. |

## 5.7 Need Assessment

As per 2017 census population results, Tando Muhammad Khan municipal area had a household size of 5.0 persons and total housing stock of 20,536 households, Most of them were categorized as Pacca houses which include Pacca (Brick construction) and RCC houses.

**Table 5-2: Housing Backlog**

| S. No. | Housing | Population | Household Size | No. of HH |
|---|---|---|---|---|
| **1.** | Present Housing Stock (Census 2017) | 101,863 | 5.0 | 20,536 |
| **2.** | **Shaheed Mohtarma Benazir Bhutto Township Tando Mohammad Khan (SMBBT)** | | | 359 |
| **3.** | Future 2037 | 162,410 | 5.0 | 32,482 |
| **4.** | **Additional HHs Required (2017-2037)** | | **5.0** | **11,587** |
| *Source: Consultants Estimate 2018 & 2017 Census Report of Tando Muhammad Khan* | | | | |

On basis of projected Population for year 2037 the increase in population is 162,410 with estimated additional housing requirement of 11,587.

## 5.8 Policy Guidelines[25]

Housing sector is divided in various sub sectors. Policy guidelines for all sub sectors are given below:

### *5.8.1* Policy Measures for Land

- Priority Identification of Land for Housing
  As an immediate measure, the provincial, municipal, metropolitan and local authorities under the plan shall identify parcels of state and other lands for housing development in the urban and rural settlements in their respective jurisdictions.

- Land Acquisition
  The procedural and legal bottlenecks in the acquisitions process shall be removed and land acquisition laws shall be suitably amended to make provision for unified, transparent and market value oriented systems

- Land Information System
  Development of a comprehensive land information system using modern technology to record correct and up to date information regarding inventory and land classification, settlement patterns, land values and land availability on all land in urban and rural areas.

[25] National Housing Policy 2001

- Land Registration and Tenure System
  The informal and customary tenure systems shall be rationalized into a formal and registered social contract.

### *5.8.2* Policy Measures for Housing Finance

- Financial Institutions shall be encouraged to give mortgage loans for housing purposes at market rates.
- Housing finance institutions shall be encouraged to promote savings and provide micro loans for low income group through community organization, NGOs and CBOs.
- Part of the sale proceeds of valuable public land shall be set aside to subsidize low income housing and housing for the poor and needy.
- Subsidized loaning facilities shall be extended for rural housing construction and improvements through micro-financing system and institutions like Khushhali Bank, Zakat funds, etc.

### *5.8.3* Policy Measures for Katchi Abadis, Squatter Settlements & Slums

- The process of regularization and up-gradation of the pre-1997 Katchi Abadis shall continue as per current policy. However, Katchi Abadis, which are hazardous by virtue of being close to railways tracks or located under high tension power lines, or are on or close to the riverbeds, or on lands needed for operational /security purposes, need to be relocated at appropriate places by LOAs.
- Formation of new Katchi Abadis shall not be allowed and shall be discouraged by exercising strict development controls in all urban areas.

### *5.8.4* Policy Measures for Low Income Housing

- In all government housing schemes, adequate plots for low income people shall be reserved to offer them at affordable prices. In addition private developers will also be encouraged to develop low cost housing schemes.
- City and District Government shall prepare housing plans to cater for the current and future housing needs for low income groups on incremental basis at affordable, cost.
- Building regulations, building by laws, and planning standards shall be revised to permit incremental development and lowering of planning standards to make it cost effective for low income groups.
- In every scheme 20% of the plots should be designated to low income group.

## 5.9 Strategic Development Plan

**i.Long Term Plan:**

- Incremental housing schemes on the lines of Orangi, Qasba, and Khuda Ki Basti etc. should be initiated based on lessons of experience.
- One stop facilitation center should be established to facilitate public, especially for unprivileged and poor households.
- Increase in proportion of small size plots could be made for low income groups in all new housing schemes.
- Low-income Housing Funds would be established to provide sufficient and affordable credit for housing to meet the needs of shelter less poor. Example is Grameen Bank which is a microfinance organization and community development bank founded in Bangladesh. It makes small loans to the impoverished without requiring collateral.

**ii.Short Term Plan:**

- Development of indigenous and cost effective approaches particularly for low income group and mass production.
- Capacity building of institutions involved in housing provision and related sectors, to safeguard against malpractices, inefficiencies, weaknesses and mafia assaults.
- Land bank to be formed to facilitate availability of suitable, affordable, safe and secure land parcels within the town for the development of housing schemes.
- Concepts of small towns should be worked out to minimize the housing requirement in secondary cities.
- An affordable housing program for low income group in different phases up to 2037, through one window operation (including technical guidance, easy loan provisions, legal procedures)
- Formulation of Green Building Byelaws for future housing to address water conservation, low energy consumption, waste recycling etc.

## 5.10 Priority Projects

### i. Development of Housing Site with Allied Services for Low Income People and Land Acquisition

- **Project Scope & Justification**

Most of the population of Municipal is living in slums areas and depreciated houses. A significant household in Tando Mohammad Khan have low income. These households are unable to acquire their own houses so resolve their housing problem resulting rising the number of slums areas and encroachment. The living condition in such areas are poor they face so many problems and mostly don't have utility services. To relieve the problems occur by this situation, the public sector in Tando Mohammad Khan should launch as part of the urban strategy, an affordable housing program for low income households.

The living condition in such areas is not very good; they face so many problems with limited facilities of utilities & infrastructure. According to Socio Economic Survey results, the status of ownership of houses is like 81% family owned, 4% rent free/Govt. employers and 13.6% on rent. Therefore on a priority basis, the provision of a developed site for residential purpose is proposed to accommodate at least 2,771 families in short term plan.

| Description | Results |
|---|---|
| Present Population census 2017 | 101,863 |
| 13.6% Population of Tando Mohammad Khan Living in rental houses with no house ownership | 13,853 |
| Households required @ 5.0 | 2,771 |
| Availability of SMBBT Fully developed Housing site with 359 plots | 2,412 |

The site of SMBBT "Shaheed Mohtarma Benazir Bhutto Townships" is located closed to the crossing of canal with railway line. The site has been fully developed with 359 plots ready for allotments to poorest of society. Approx. 2,412 Number of housing units up to 120 sq. yds will be proposed. Tentative ten million cost per acres for site development and five million per acre cost for land acquisition is estimated with all allied facilities and infrastructure. The purpose of this project is to:

- Provide affordable shelters to the poor people
- Through this process alternate resettlement of the congested part of the towns may be possible
- This process improve the living standard of the town

The development of housing site / scheme will be as per the minimum standards to reduce the cost of the project.

- **Project Benefits**

Part of the capital expenditure is expected to be recovered through Sale of commercial plots and buildings. The project is expected to generate direct income. The project will directly give benefit to the low income people. Improve in living conditions are associated with the improvement of social and long term economic benefit.

- **Implementing Authority -** Government of Sindh, Tando Mohammad Khan Municipal Committee, and HESCO etc.

- **Estimated Cost: 1,950.00 Million Approx**. (Short Term)

| Project Name | Long / Short Term | Proposed Area (acre) & Lengths (m) | Preliminary Cost (million/- PKR) | Justification |
|---|---|---|---|---|
| Land acquisition for Development of Housing Site for Low Income Group | Short Term | 130 acre | 650.00 | 2,412 Number of units up to 120 sq. yds. 20 houses per acre. For this proposed site land acquisition assumed five million per acre. |
| Development of Housing Site for Low Income Group | Long Term | 130 acre | 1,300.00 | 2,412 Number of units up to 120 sq. yds. 20 houses per acre. For this proposed site development we have assumed ten million per acre with internal allied facilities and infrastructure. |

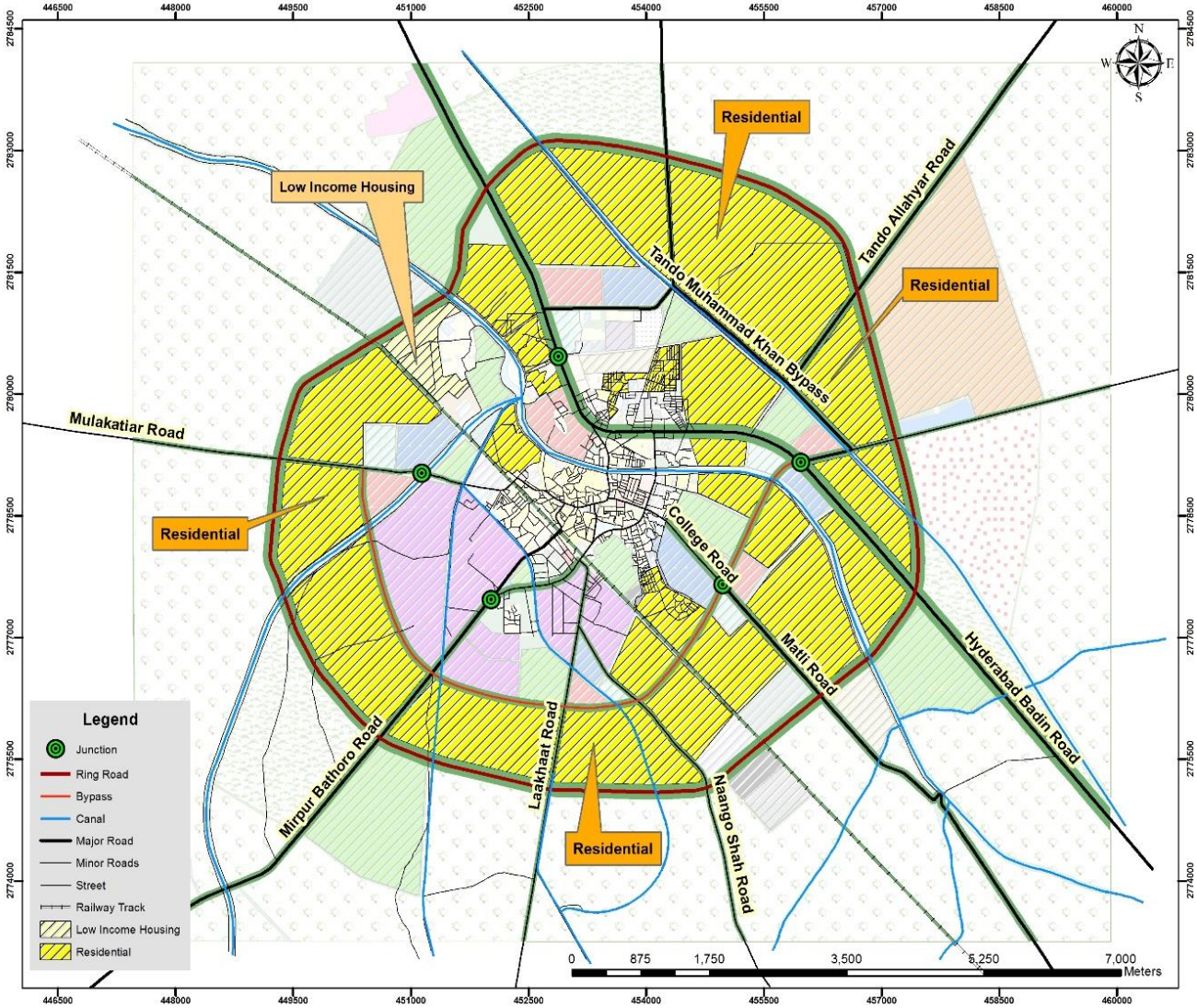



**Figure 5-1: Housing Proposal Tando Mohammad Khan Town**

# 6. SOCIAL INFRASTRUCTURE

## 6.1 Education

The reason for the deterioration of education in government schools in Pakistan, especially primary and secondary education, is that the standard of educational expenditure set by the UNESCO is minimum 4% of the GNP, but Pakistan during last 66 years has been spending on an average only 2% of the GNP. The state of education in Sindh is best reflected in its literacy figures and in the serious disparity between rural and urban areas. The Sindh has the largest number of ghost schools in the country and thousands ghost teachers draw government salaries. The education sector in Sindh is facing many challenges; major being very low enrolment level, rural and gender disparity, and low level of quality education. Besides, the alarming fact that there is a large number of out of school children, even those in the systems are not performing and learning outcomes are less than optimal. There are also issues of large number of closed schools and poor infrastructure in functional schools.

There is overall poor condition of schools and college due to Lack of repair and maintenance of buildings, lack of playgrounds, libraries, electricity, labs, toilets etc.

### *6.1.1* Existing Situation

In district Tando Muhammad Khan, there are 1,012 viable schools out of which 880 are functional, 58 schools are temporary dysfunctional, 51 schools are viable dysfunctional, and 23 are permanently dysfunctional. Furthermore, out of total viable schools in the district Tando Muhammad Khan, 194 schools are for boys, 116 schools for girls and the remaining 702 schools are co-education[26]. The enrolment in viable schools of the district is 63,221 (male 41,980 and female 21,241), the number of teaching Staff is 2,492 out of which 1,955 are male and 537 are Female.

**Figure 6-1: Mir Ghulam Ali Khan Talpur Govt. Boys Degree College TMK**

Besides, the government is working on public assisted schools through Public-Private Partnership with **Sindh Education Foundation (SEF**). Ten schools are working under SEF in District Tando Muhammad Khan. The number of enrolment in these schools is 2,573 with 61 classrooms and the number of teachers is 72.[27]

### *6.1.2* Condition of Educational Institutions

The government schools and colleges in district are in worst condition due to Lack of repair and maintenance of buildings, lack of playgrounds, libraries, electricity, labs, toilets etc. To bring universal

*26 Sindh Education Profile 2016-2017.*

[27] *Sindh Education Profile 2016-2017.*

education ratio there is need to double the efforts by engaging teachers, increasing capacity of schools, operationalization of existing closed school and opening of new schools.

**Table 6-1: Present Education Institutions and Enrolment Record at Taluka Level**

| S. No | Type | Numbers | Class rooms | Total Enroll | Teacher | Student Capacity Per Room | Teacher Student Ratio |
|---|---|---|---|---|---|---|---|
| 1 | **Govt. Girls Primary Schools (GGPS)** | 38 | 79 | 2,227 | 92 | 28 | 24 |
| 2 | **Govt. Boys Primary Schools (GBPS)** | 42 | 74 | 1,740 | 81 | 24 | 21 |
| 3 | **Primary School (co-education)** | 177 | 343 | 13,192 | 476 | 38 | 28 |
| 4 | **Middle School (Boys)** | 2 | 7 | 197 | 17 | 28 | 12 |
| 5 | **Middle School (Girls)** | 3 | 7 | 97 | 17 | 14 | 6 |
| 6 | **Middle School (Co-education)** | 1 | 1 | 58 | 8 | 7 | 58 |
| 7 | **Elementary school(Co-Education)** | 3 | 29 | 720 | 37 | 25 | 19 |
| 8 | **Elementary school(Girls)** | 1 | 4 | 44 | 2 | 11 | 22 |
| 9 | **Elementary school(Boys)** | 3 | 11 | 591 | 28 | 54 | 21 |
| 10 | Total | 270 | 573 | 18,866 | 758 | 25 | 23 |

*Source: RSU (Reform Support Unit RSU Education & Literacy Department. Government of Sindh 2017).*

**Table 6-2: Present Education Institutions and Enrolment Record (Secondary and Higher secondary Schools)**

| S. No | Type | Total No. | Class rooms | Total Teachers | Total Enroll | Student Capacity Per Room | Teacher Student Ratio |
|---|---|---|---|---|---|---|---|
| 1 | **Secondary School (Girls)** | 6 | 102 | 223 | 3448 | 34 | 15 |
| 2 | **Secondary School (Boys)** | 5 | 68 | 148 | 2972 | 44 | 20 |
| 3 | **Secondary School (Mixed)** | 4 | 31 | 58 | 1363 | 44 | 24 |
| 4 | **High Secondary Schools (Co-education)** | 1 | 22 | 39 | 1,227 | 56 | 31 |
| | **Total** | **16** | **223** | **468** | **9,010** | **40** | **19** |

*Source: RSU (Reform Support Unit RSU Education & Literacy Department. Government Of Sindh 2017)*

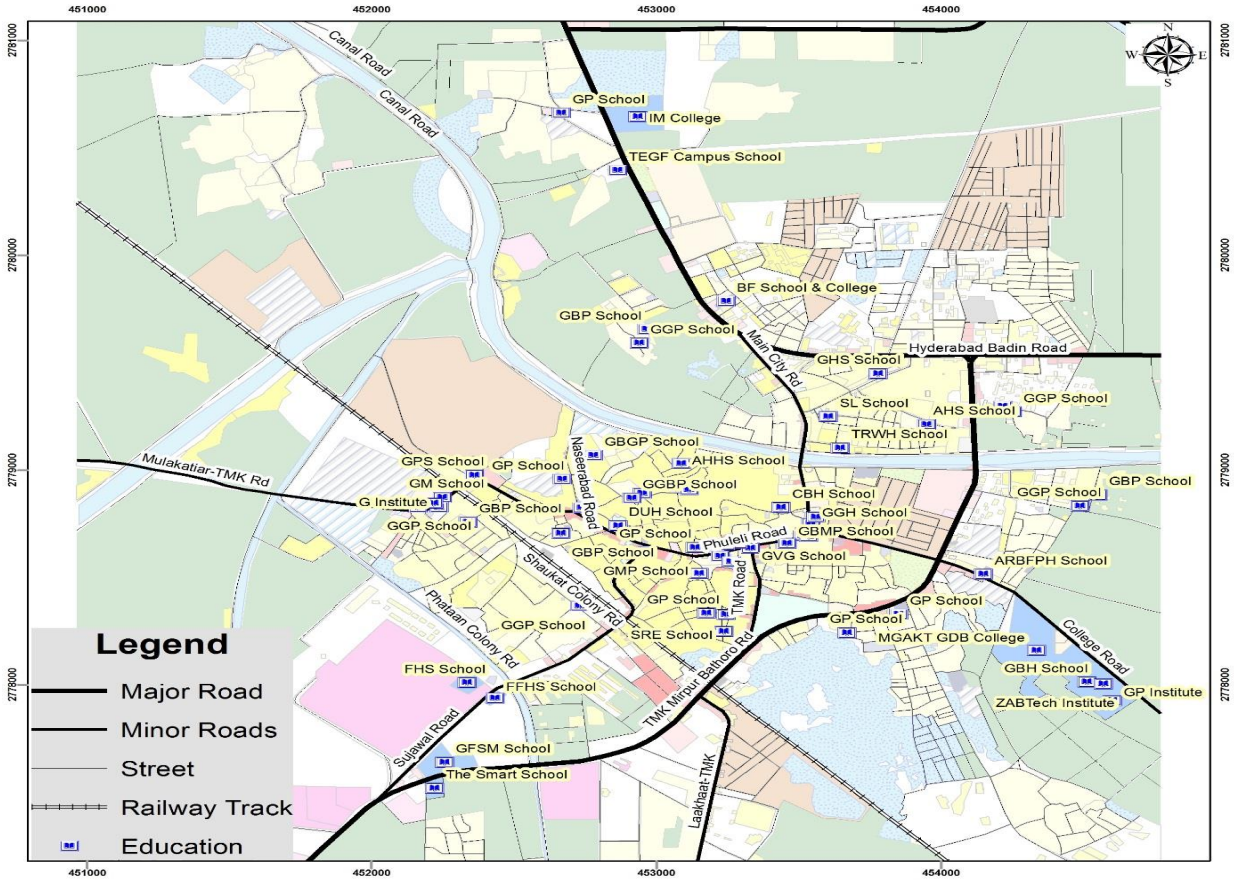



**Figure 6-2: Educational Institutions in Tando Muhammad Khan town**

- **Technical Institutions**

  The present number of technical institutions in district Tando Muhammad Khan are 2. 1 male polytechnic institution with total enrolment of 150 and teaching staff of 8. There is only one female vocational institution with the enrolment of 40 (female 40) having teaching staff of 4 (female: 40).

**Table 6-3: Present Technical Institutions and Enrolment Record**

| Institutions | No. of Institutions | | | Enrolment | | | Teaching Staff | | |
|---|---|---|---|---|---|---|---|---|---|
| | TOTAL | Male | Female | TOTAL | Male | Female | TOTAL | Male | Female |
| **Technical institutions** | **2** | **1** | **1** | **190** | **150** | **40** | **12** | **8** | **4** |
| **Polytechnic Institutions** | **1** | **1** | **-** | **150** | **150** | **-** | **8** | **8** | **-** |
| **Vocational Institutions and Vocational Schools** | **1** | **-** | **1** | **40** | **-** | **40** | **4** | **-** | **4** |
| *Source: College Education Statistics-2014-15* | | | | | | | | | |

### *6.1.3* Issues

Need Assessment and identification of major issues of education sector in Tando Muhammad Khan are as follows:

- Shortage of class rooms as per current enrolment
- Low enrolment level with gender disparity
- Shortage of teachers causing low quality of education
- Lack of provision of basic facilities i.e. washrooms, electricity, drinking water etc.
- Poor condition of schools and colleges due to lack of repair and maintenance of buildings
- In addition to classrooms, the rehabilitation of existing educational buildings with all basic and allied facilities are also required. Lack of allied facilities includes furniture, playground, laboratories, libraries etc.

### *6.1.4* SWOT Analysis

| EDUCATION | | | |
|---|---|---|---|
| **Strength** | **Weakness** | **Opportunity** | **Threats** |
| 1. Urban literacy rate is higher than rural. | 1. Illiteracy in rural areas at district level.<br>2. The trend of losing public institutes and universities.<br>3. Less highly educated personnel's. | 1. More people will move to urban areas for education.<br>2. More educational institutes are required.<br>3. More PPP for education sector.<br>4. Good labor force available for professions like sales and retail marketing. | 1. The children of peasants and farmers will not get education.<br>2. Relocation of educated class to other major towns of province.<br>3. The trend is barrier to establish higher education institutes offend private sector. |

### *6.1.5* Present Need Assessment 2017

**I. <u>District Tando Muhammad Khan (Includes primary to Higher education institutions)</u>**

- As per NRM (National Reference Manual) and NEP (National Education Policy) standards, students per classroom occupancy ratio are 30 students per classroom for primary, middle and secondary level. Total enrolment and the available number of classrooms show that there is a present shortage of classrooms.

- The present need can be fulfilled by providing new classrooms in existing school buildings or providing new school buildings with the provision of playgrounds and other facilities.

- Therefore, for the short term plan, Tando Muhammad Khan district needs 218 extra classrooms.

| Table 6-4: Education Sector of Tando Muhammad Khan District | | |
|---|---|---|
| **S. No** | **Description** | **Results** |
| **1.** | Total Enrolments | 63,221 |
| **2.** | Total Number of available Class Rooms | 1,889 |
| **3.** | Student Per Class Room @ NRM Standard (Primary to Secondary) | 30 |
| **4.** | Present Occupancy Load of Students per Class Room | 33 |
| **5.** | Class Rooms Required for present need | 2,170 |
| **6.** | Additional numbers of Class rooms | 218 |
| *Source: Sindh Education profile 2016-17 and Consultant's Estimates 2017* | | |

**II. <u>Taluka Tando Muhammad Khan (Includes primary, middle, and Elementary education institutions)</u>**

- Short term plan, for taluka provision of 74 classrooms at schools of different levels are required with the repairing of existing buildings with all basic facilities and training of teaching staff is required.

| Table 6-5: Present need of Classrooms in Taluka Tando Muhammad Khan | | |
|---|---|---|
| **S. No.** | **Description** | **Results** |
| **In Schools of Tando Muhammad Khan taluka (Primary, Middle, and Elementary)** | | |
| **1** | Total Present Enrolments | 18,866 |
| **2** | Classrooms available at present | 555 |
| **3** | Students per classrooms at present | 34 |
| **4** | Classrooms required for present need @ 30 students per class room | 629 |
| **5** | Present shortage pf classrooms | 74 |

**III. <u>Taluka Tando Muhammad Khan (Includes Secondary and High Secondary education institutions)</u>**

- The available number of classrooms for students are 223. As per the present figures provided by the Reform Support Unit (RSU) and Education & Literacy Department, the occupancy rate in the present classrooms is a very high 40 students per classroom. As per National Reference Manual (NRM) 40 students per classroom is the standard for college-level education. Based on standard occupancy of 40 students per classroom, currently, there is need of only 2 additional classrooms in secondary and high secondary schools of Tando Muhammad Khan taluka.

| Table 6-6: Requirement of Classrooms in Taluka Tando Muhammad Khan | | |
|---|---|---|
| **S. No.** | **Description** | **Results** |
| **In Schools of Tando Muhammad Khan taluka (Secondary and High Secondary)** | | |
| **1** | Total Present Enrolments | 9,010 |
| **2** | Classrooms available at present | 223 |
| **3** | Students per classrooms at present | 40 |
| **4** | Classrooms required for present need @ 40 students per class room | 225 |
| **5** | Present shortage pf classrooms | 02 |

### *6.1.6* Future Assessment (2037)

**a. <u>District Tando Muhammad Khan</u>**

**i. <u>Primary to Higher Secondary</u>**

The long term plan target is to achieve 100% enrolment with a 1:1 male-female ratio by 2037; therefore 6,783 additional classrooms will be required to accommodate the upcoming generation for the next twenty years. This need could be fulfilled either by addition in existing buildings or more new schools and colleges will need to construct in future to serve an additional estimated population of 1,069,808.

| Table 6-7: Future Requirement of Classrooms in Tando Muhammad Khan District District | | |
|---|---|---|
| **S. No.** | **Description** | **Results** |
| **Primary to Higher secondary** | | |
| **1** | Expected total enrolment by 2037 @ 100% enrolment | 260,284 |
| **2** | Total classrooms requirement till 2037 | 8,672 |
| **3** | Present Supply (2017) | 1,889 |
| **4** | Additional classrooms requirement till 2038 | 6,783 |

**b. Taluka Tando Muhammad Khan**

**i. Primary to High Secondary**

The long term plan target is to achieve 100% enrolment with a 1:1 male-female ratio by 2037; therefore, 2,340 additional classrooms will be required to accommodate upcoming generation for the next twenty years. This need could be fulfilled either by addition in existing buildings or more new schools and colleges will need to construct in future to serve an additional estimated population of 384,487.

**Table 6-8: Future Requirement of Classrooms in Tando Muhammad Khan Taluka**

| S. No. | Description | Results |
|---|---|---|
| **Primary to high secondary** | | |
| **1** | Expected total enrolment by 2037 @ 100% enrolment | 93,546 |
| **2** | Total classrooms requirement till 2037 | 3,118 |
| **3** | Present Supply (2017) | 778 |
| **4** | Additional classrooms requirement till 2037 | 2,340 |

### *6.1.7* Policy Guidelines[28]

- Development of Teachers and professional substitutes;
- Construct required schools and higher education institutions in all districts. Take stock of operational and staffed schools and eliminate ghost schools.
- Launch a rural education program.
- Ghost Schools and absentee teacher should be identified and removed.
- Maintenance of existing depilated schools and buildings should be given top priority.
- For girls' literacy and women education, informal system of homeschool may be encouraged.

### *6.1.8* Strategic Development Plan

This Strategic Development Plan aims to strengthen existing schools system to bring socio-economic and sustainable development in the region. The focus of this plan is centered chiefly on improving education standard at primary and secondary levels and providing extra curriculum opportunities to address the needs of youth in rural and remote areas. This will increased the literacy ratio, living standard, employment opportunities of the future population.

[28] Sindh Vision 2030

**i. Long Term Plan**

- Increasing equitable access to quality ECE (Early childhood education), primary and secondary education
- Improving the quality of learning outcomes through strengthening the teaching/learning process, improving the quality of teachers through merit-based selection and recruitment; improved accountability, and establishing a competency-based constructivist system of educational professional development.
- Enhancing the equity of resource allocation and improving the fiscal sustainability and effectiveness of educational expenditure, thereby fostering transparency and accountability in the use of public resources.
- Sindh Technical and Vocational Training authority (STEVTA) is providing the technical education to the people of Sindh for increasing their technical Skills. In Tando Muhammad Khan, the peoples are significantly deficit in technical skills. By implementation of this project, people will enhance their technical skills and it also increase the employment status of the district.

**ii. Short Term Plan**

- Rehabilitations of Schools and Colleges with allied infrastructure
- MC to take over all site provided for schools in the new housing schemes to eliminate the chances of misuse and encroachment.
- Training programme for teachers to increase capacity building
- Vocational and skill training centers in alliance with contemporary demand
- Rehabilitation/Construction of Women Hostels for Teaching Staff and Working Women

### *6.1.9* Priority Projects

**i. Construction/ Rehabilitation Of Schools & Allied Infrastructure**

➢ **Project Justification**

Education Plays Very Important Role to achieve the goals of any urban strategy. Currently, the situation of Primary to Higher Secondary in Tando Mohammad Khan is not in satisfactory condition. Education should be the one of major goal of any urban strategy. Importance must be placed on girls schools because it was badly disregarded. At present, the condition of exisiting schools in DHQ town needs rehabilation and improvement of the infrastructure and Allied basic facilities like water, electricity, toilet, playgrounds etc. (excluded the Core Urban Area of Tando Mohammad Khan)*. The List of the schools in this project are given bellow:

| S.No | Name | Area |
|---|---|---|
| 1 | Govt. Girls Primary School | 0.26 |
| 2 | Govt. FSM High School | 4.32 |
| 3 | Girls Middle School | 0.04 |
| 4 | Govt. Institute | 0.09 |
| 5 | Govt. Boys High School | 3.37 |
| 6 | Govt. Polytechnic Institute | 4.18 |
| 7 | ZABTech Institute of technical & Vocational Education | 1.12 |
| 8 | Govt. Boys Primary School | 0.11 |
| 9 | Mir Ghulam Ali Khan Talpur Govt. Degree Boys College | 17.72 |
| 10 | Govt. Higher Secondary School | 0.16 |
| 11 | Govt. Service Center for Special Education | 0.03 |
| 12 | Govt. Girls Primary School Shoukat Colony | 0.03 |
| 13 | Govt. Girls Primary School Talpur Colony | 0.16 |
| 14 | Govt. Boys Primary School Barrage Colony | 0.09 |
| 15 | Govt. Boys Primary School | 0.06 |
| 16 | Govt. Girls Primary School | 0.08 |
| 17 | Govt. Girls Primary School Mushtarqa Colony | 0.13 |
| 18 | Govt. Boys Primary School Mushtarqa Colony | 0.07 |
| 19 | Govt. Primary School People's Colony | 0.08 |
| 20 | Govt. Primary School People's Colony | 0.04 |
| 21 | Govt. Primary School Tando Saindad | 0.22 |
| | **Total Area in Acres** | **32.35** |

- **Project Benefit -** By the increasing in the litracy ratio the living standard of the population will improve and increase the employment oppertunities with in the district..

- **Implementing Authority -** Department of the Education –Provincial Government and TMK Municipal Committee
- **Estimate Cost**: 845.50 million approx.

**ii. Establishment of Various capacity Building Training Programms to enhance Teaching / Academic capacities of Teachers.**

- **Project Justification:** Teacher's capacity Building Training Programs shall help to enhance Academic capacities. They note a marked improvement in their understanding of learning methodologies, child development, teacher-student relationship and the value of quality academic environment. By the implementation of this project, academic related people will enhance their teaching skills and it also introduces modern methods of teaching.

- **Project Benefits:** By implementation of this project, it will Increase the technical interests of the district and also increase literacy ratio to increase the employment and also boosts the city development.
- **Implementing Authority -** Government of Sindh, STEVTA, Education Department and District Works & Services Department Government of Sindh.
- **Estimated Cost: 20.00** Million PKR Approx.

| Project Name | Short Term | Proposed Area (acre) & Lengths (m) | Preliminary Cost (million/- PKR) | Justification |
|---|---|---|---|---|
| Rehabilitation of Schools & Allied Infrastructure (excluding Core Urban Area with 30% built-up area) | Short Term | **32.35** acre | 845.50 | 9.70 acre = 422749.8 sft, at the rate of 2000/- PKR per sft construction cost with all infrastructure cost. (considered 30% as Built up Area) |
| Establishment of Various capacity Building Training Programms to enhance Teaching / Academic capacities. | Short Term | - | 20.00 | Teachers Capacity building programs can also strengthen their teaching skills for better results. |

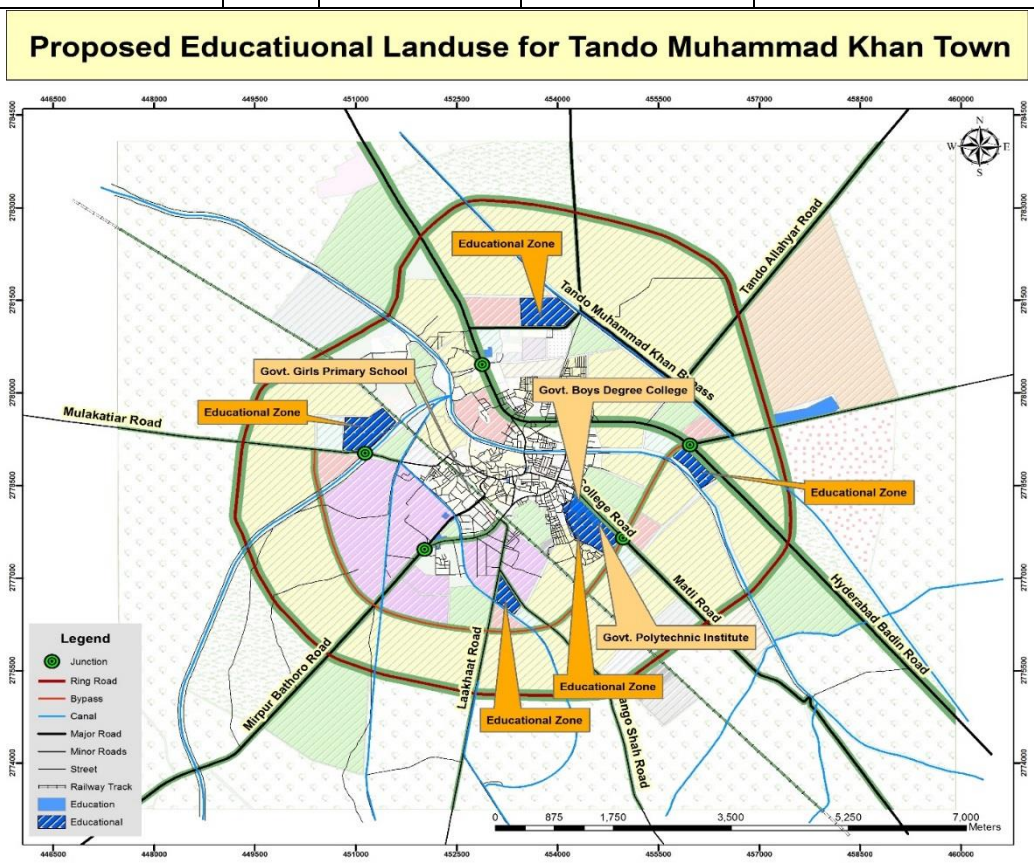



**Figure 6-3: Educational Proposals for Tando Mohammad khan**

### *6.1.10* Immediate Action Plan for Core Urban Area

- **Rehabilitation and Up gradation of Schools**

All schools marked in core urban area along Phuleli Road should be rehabilitate with the structural stability, building repair work, access to utilities, provision of facilities, replacement of old furniture, presence of teaching and non-teaching staff etc. The up gradation could be made through addition of new building in same compound or addition of number of floors for new class rooms and allied facilities.

| Core Town Area - Tando Muhammad Khan (Rehabilitation Of Education Facilities) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| S. No | Education Facility Name | Area (acre) | Rehabilitation Required Area wise or job wise cost (PKR) | | | | | | | |
| | | | Street / Road / Parking | Utility Facilities | | | | | School Building Repair/ Renovation | Security |
| | | | | Electricity | WS | SW | Gas | PTCL | | |
| 1 | Govt. Girls (Prov) Campus School | 0.21 | 0.21 | 0.24 | 0.31 | 0.31 | 0.21 | 0.05 | 0.10 | 0.05 |
| 2 | Govt. Girls Degree College | 0.60 | 0.60 | 0.69 | 0.90 | 0.90 | 0.60 | 0.15 | 0.30 | 0.15 |
| 3 | Govt. Girls High School T.M. Khan | 0.28 | 0.28 | 0.32 | 0.42 | 0.42 | 0.28 | 0.07 | 0.14 | 0.07 |
| 4 | Govt. Boys Main Primary School | 0.27 | 0.27 | 0.31 | 0.40 | 0.40 | 0.27 | 0.07 | 0.13 | 0.07 |
| 5 | Govt.Boys Main Primary School | 0.19 | 0.19 | 0.22 | 0.29 | 0.29 | 0.19 | 0.05 | 0.10 | 0.05 |
| 6 | Darul Uloom High School | 0.16 | 0.16 | 0.19 | 0.24 | 0.24 | 0.16 | 0.04 | 0.08 | 0.04 |
| 7 | Government Public Girls School | 0.30 | 0.30 | 0.35 | 0.45 | 0.45 | 0.30 | 0.08 | 0.15 | 0.08 |
| **Total** | | **2.02** | **2.02** | **2.32** | **6.02** | | **2.02** | **0.50** | **1.01** | **0.50** |
| **Total PKR Rs. Million** | | | **14.41** | | | | | | | |

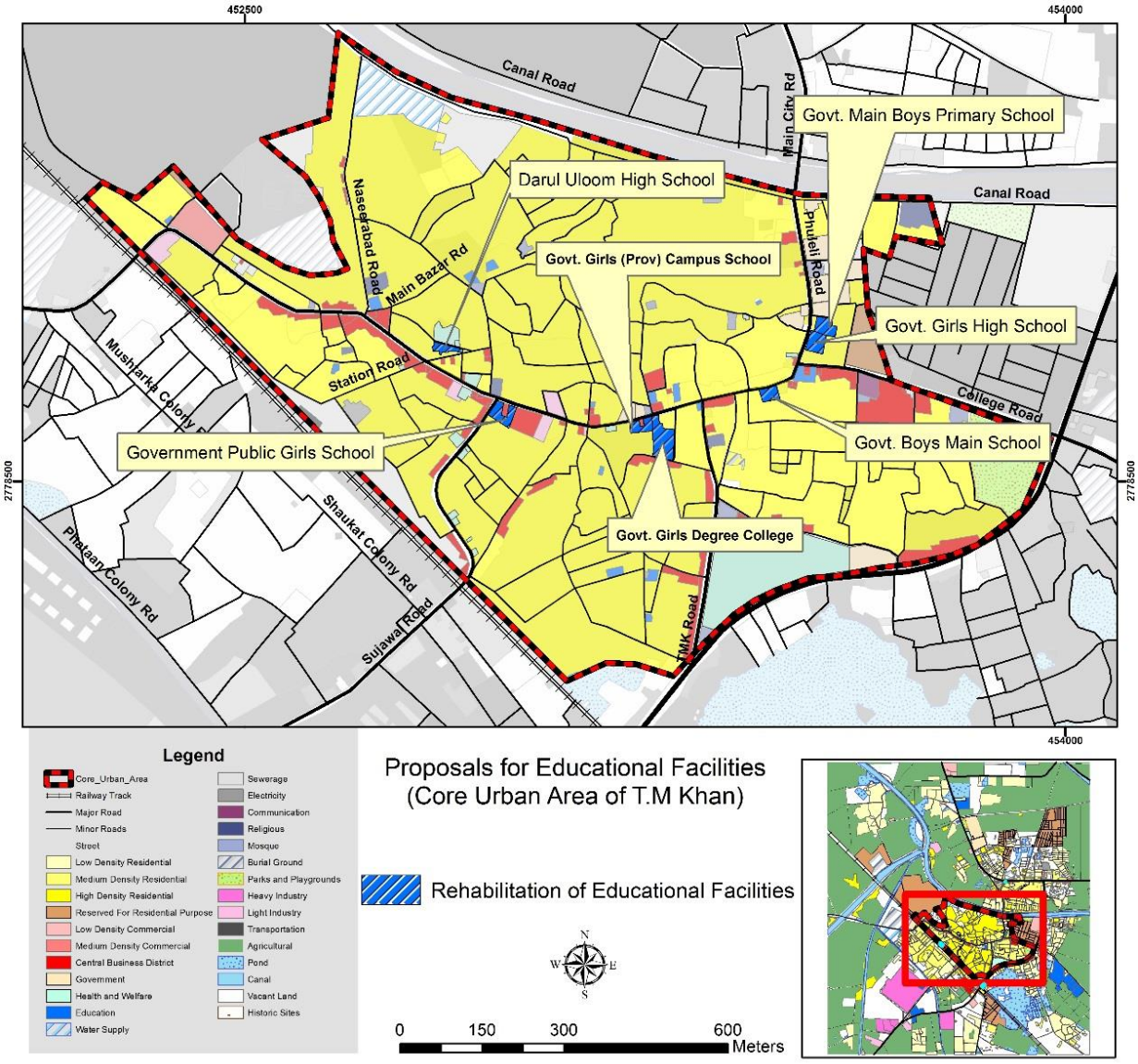



**Figure 6-4: Rehabilitation of Educational Facilities of Core Urban Area of Tando Muhammad Khan**

## REHABILITATION OF EDUCATION FACILITIES

| S. No | Education Facility Name | Area (acre) | Rehabilitation Required Area wise or job wise cost (PKR) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Street / Road / Parking | Utility Facilities | | | | | School Building Repair/ Renovation | Security |
| | | | | Electricity | Water Supply | Sewerage | Gas | PTCL | | |
| 1 | Govt. Girls (Prov) Campus School | 0.21 | 0.21 | 0.24 | 0.31 | 0.31 | 0.21 | 0.05 | 0.10 | 0.05 |
| 2 | Govt Girls Degree College | 0.60 | 0.60 | 0.69 | 0.90 | 0.90 | 0.60 | 0.15 | 0.30 | 0.15 |
| 3 | Govt. Girls High School T.M. Khan | 0.28 | 0.28 | 0.32 | 0.42 | 0.42 | 0.28 | 0.07 | 0.14 | 0.07 |
| 4 | Govt.Boys Main Primary School | 0.27 | 0.27 | 0.31 | 0.40 | 0.40 | 0.27 | 0.07 | 0.13 | 0.07 |
| 5 | Govt.Boys Main Primary School | 0.19 | 0.19 | 0.22 | 0.29 | 0.29 | 0.19 | 0.05 | 0.10 | 0.05 |
| 6 | Darul Uloom High School | 0.16 | 0.16 | 0.19 | 0.24 | 0.24 | 0.16 | 0.04 | 0.08 | 0.04 |
| 7 | Goverment Public Girls School | 0.30 | 0.30 | 0.35 | 0.45 | 0.45 | 0.30 | 0.08 | 0.15 | 0.08 |
| **Total** | | 2.02 | 2.02 | 2.32 | 3.02 | | 2.02 | 0.50 | 1.01 | 0.50 |
| **Total PKR Rs. Million** | | | **11.39** | | | | | | | |

| TANDO MUHAMMAD KHAN - CORE TOWN AREA | | | REHABILITATION OF EDUCATION FACILITIES | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| S.No | Education Facility Name | Area (acre) | Rehabilitation Required Area wise or job wise cost (PKR) | | | | | | | |
| | | | Street / Road / Parking | Utility Facilities | | | | | School Building Repair/ Renovation | Security |
| | | | | Electricity | Water Supply | Sewerage | Gas | PTCL | | |
| 1 | Govt. Girls (Prov) Campus School | 0.21 | 0.21 | 0.24 | 0.31 | 0.31 | 0.21 | 0.05 | 0.10 | 0.05 |
| 2 | Govt Girls Degree College | 0.60 | 0.60 | 0.69 | 0.90 | 0.90 | 0.60 | 0.15 | 0.30 | 0.15 |
| 3 | Govt. Girls High School T.M. Khan | 0.28 | 0.28 | 0.32 | 0.42 | 0.42 | 0.28 | 0.07 | 0.14 | 0.07 |
| 4 | Govt.Boys Main Primary School | 0.27 | 0.27 | 0.31 | 0.40 | 0.40 | 0.27 | 0.07 | 0.13 | 0.07 |
| 5 | Govt.Boys Main Primary School | 0.19 | 0.19 | 0.22 | 0.29 | 0.29 | 0.19 | 0.05 | 0.10 | 0.05 |
| 6 | Darul Uloom High School | 0.16 | 0.16 | 0.19 | 0.24 | 0.24 | 0.16 | 0.04 | 0.08 | 0.04 |
| 7 | Goverment Public Girls School | 0.30 | 0.30 | 0.35 | 0.45 | 0.45 | 0.30 | 0.08 | 0.15 | 0.08 |
| **Total** | | **2.02** | **2.02** | **2.32** | **3.02** | | **2.02** | **0.50** | **1.01** | **0.50** |
| **Total PKR Rs. Million** | | | **11.39** | | | | | | | |

## 6.2 Health

In Sindh maternal health facilities and proper reproductive care is not available at the required scale. Low levels of maternal health and nutrition coupled with high fertility rates lead to high mortality and morbidity among mothers and also children, particularly in the rural areas. The lack of such healthcare endangers the life of the mother and the child. In Sindh the fertility rates average at 6.0 births by women by the age 45-49 and more than 4,000 mothers die every year due to pregnancy related issues. Consequently, poor women's health in Sindh is as much a medical as social problem. Underlying factors here are the lack of awareness of and attention to, women's health needs; women's lower education and social status; and social constraints on women and girls, including the practice of seclusion.

### *6.2.1* Existing Situation

Currently, tertiary level health facilities of Taluka hospital THQ and BHUs are serving the regional population of Tando Muhammad Khan district. There is 1 civil Hospital at District having 30 beds and 3 private Hospitals having 100 to serve the District. The other health facilities spread over the entire district are three (3) RHC having 34 beds, 3 TB Clinics, and 15 BHUs, having bed strength 32 and 17 dispensaries.[29]

The total dispensaries at district Tando Muhammad Khan are 17, out of total 1 is Government, 5 are Local Bodies and 11 are private. Additionally, there is only one Private M.C.H.C (Mother and Child Health Centre) and 3 Government T.B clinics in the premises of the district.

**Table 6-9: Government and Private Health Facilities with bed capacity in district TMK**

| Type | No. | Beds |
|---|---|---|
| Civil | 1 | 30 |
| Taluka | - | - |
| BHUs | 15 | 32 |
| RHCs | 3 | 34 |
| Private | 3 | 100 |
| National Institute of Cardiovascular Diseases, TMK. | 1 | 100 |
| Indus Medical College and Hospital | 1 | 500 |
| **Total** | 24 | 796 |

*Source: Health Profile of Sindh, 2017*

**a. Laboratories**

Currently, THQ/DHQ is facing a lot of problems due to the unavailability of Laboratories. The shortage of electricity, surgical instruments, and lack of machinery are major issues.

**b. Drug Supplies**

The complete range of items was not available at the majority of the surveyed facilities. The most common reason for their non-availability was undersupply or delayed supply or lack of procurement powers at the district level. The DHQ/THQ Hospital and other health facilities are facing a lot of problems regarding the shortage of medicines supply. Most of the patients have to purchase medicines from the local market rather than from the hospital. The presence of sub-standard medicines in local markets adds troubles for the patients.

[29] Health Profile of Sindh 2017

**c. Private Health Facilities**

Few private health facilities are working in Tando Muhammad Kahn city like Memon Charitable, Maternity Home and Child Welfare center, Sami Ul Shafi Hospital, TM Khan Medical Center, Indus Medical College and Hospital, and National Institute of Cardiovascular Diseases.

**d. Indus Medical College and Hospital**

Currently, at tertiary level private health facilities, Indus Medical College and Hospital is serving the regional population of South Sindh at Tando Muhammad khan. According to official sources of Indus Hospital, there are currently 500 beds in Teaching Hospital.

**e. Preventive Health Care**

Provincial Health Department Government of Sindh and Tando Muhammad Khan District Administration is quite active in preventive health measures and from time to time has run various campaigns such as Polio Eradication (Anti-polio campaign), Malaria Control Program, Epidemiological Data Collection, TB Control Program DOTs, Leishmianiasis, Leprosy Control Program and Aids Awareness Program.

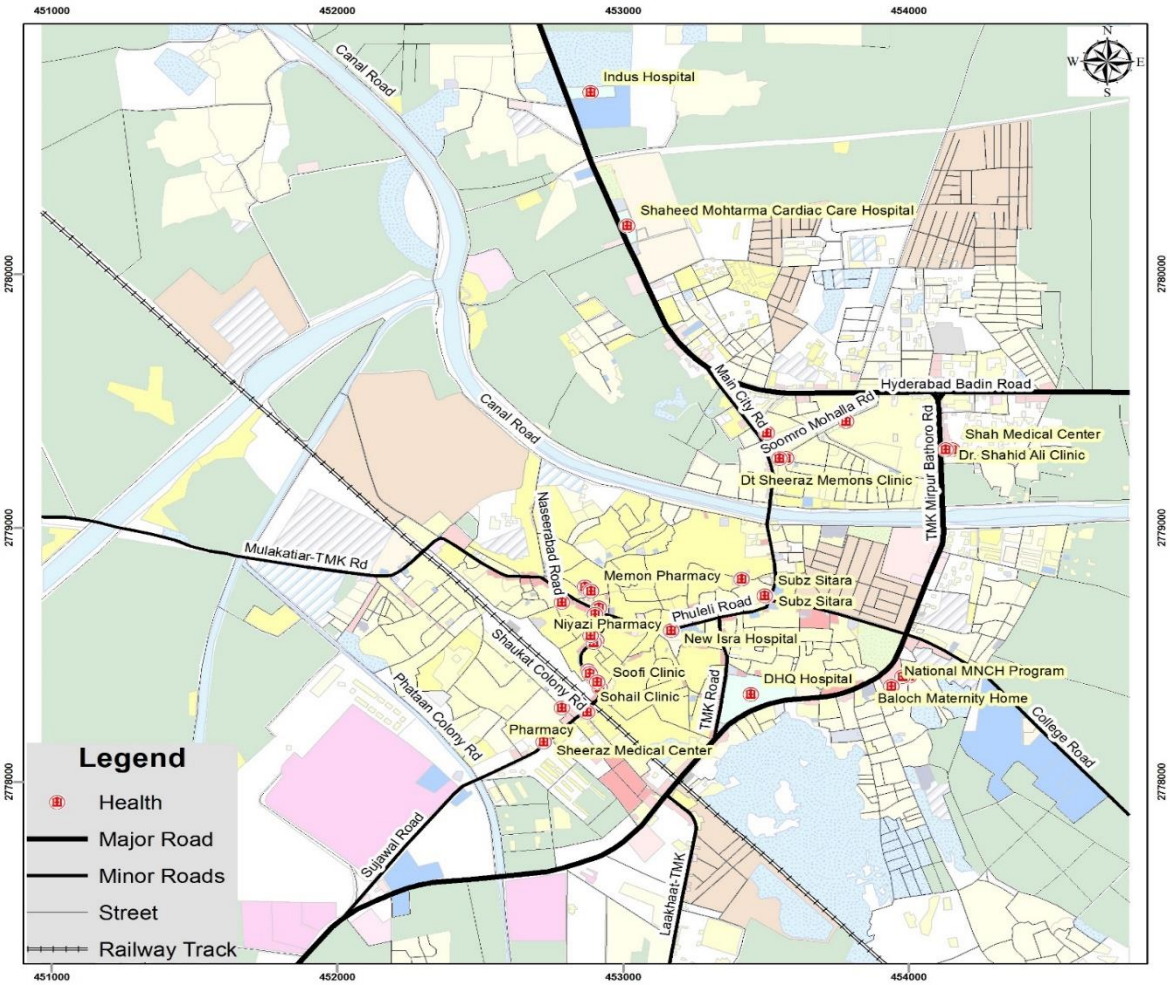



**Figure 6-5: Health Map of Tando Muhammad Khan MC**

### *6.2.2* Issue

The following are the major issues in the health sector:

- Large number of Vacant posts of doctors and medical staffs in health institutes of the district.
- Lack of training and housing facilities for LHW and paramedical staff
- Accessibility to health care facilities in remote rural areas is difficult.
- Lack of Health facilities such as wards, labs and OT facilities
- Lack of diagnostic and other Health equipment
- Deficiency of transferring serious cases from rural areas to hospitals

### *6.2.3* SOWT Analysis

| HEALTH | | | |
|---|---|---|---|
| **Strength** | **Weakness** | **Opportunity** | **Threats** |
| Availability of DHQ hospital in Tando Muhammad khan | 1. Limited health facilities in urban area.<br>2. Shortage of beds<br>3. Shortage of doctors and paramedic staff | 1. More investment is required through PPP in health sector.<br>2. More job opportunities for doctors. | 1. Less emergency response to health incidents.<br>2. Death rate may increase.<br>3. Difficult to control eradication of epidemics diseases. |

### *6.2.4* Present Need Assessment 2017

#### a. District Tando Muhammad Khan

The NRM (National reference Manual) recommends 2 beds per thousand as the medium-term target. On this basis, approximately 1,354 beds will be required to provide gradually. Even though, available beds are 796, further 558 beds are required to fulfill the present need of the inhabitants for bed capacity. The shortage of doctors and paramedical staff, laboratory equipment, diagnostic services and quality of buildings are an evident problem in small/medium towns and will need to be tackled with an increase in beds.

**Table 6-10: Present Need Assessment of Health Sector at District Level (2017)**

| Present Population | Available Beds | Present need | Required Beds | Available Doctors | Present Need of Doctors | Required Doctors |
|---|---|---|---|---|---|---|
| **677,228** | 796 | 1,354 | 558 | 21 | 667 | 646 |

According to WHO (World Health Organization) standards, doctor to population ratio is 1:1000, so taking that as a reference point, the present need of doctors is 667 while the number of available doctors is 21, and on this basis the 646 more doctors are required to the health facilities of the public sector.

### *6.2.5* Future Assessment (Population, Bed Ratio)

#### a. District Tando Muhammad Khan

Therefore, the target up to the year 2037 is to provide 2 beds per 1000 projected district population as per standard is given in the National Reference Manual on Planning and Infrastructure Standards (NRM). **The required beds for 2037 are 1,344 and doctors are 1,049, the given numbers are excluded from the private hospitals and Clinics**. Present Need-Supply of beds and Doctors are given in below given table.

**Table 6-11: Future Need Assessment at District level**

| Future Health Need Assessment at Tando Muhammad Khan District till 2037 | | | | | | |
|---|---|---|---|---|---|---|
| **Future Population (2037)** | **Available Beds** | **Future Need** | **Required Beds** | **Available Doctors** | **Future Need of Doctors** | **Required Doctors** |
| **1,069,808** | 796 | 2,140 | 1,344 | 21 | 1,070 | 1,049 |

### *6.2.6* Policy Guidelines[30]

- Enhance basic health care by making it more accessible & affordable, efficient, effective and timely. This will be achieved by diversifying outlets through the involvement and support of other organizations that provide health or health related services.
- Regulate protection from disease and the quality of healthcare across the province.
- Protect people against pollutions of all forms and types, and infectious diseases by promoting public health and by upgrading curative care facilities.
- Enhance and improve existing emergency care facilities and trauma centers, including ambulance services and paramedic forces.

### *6.2.7* Strategic Development Plan

#### i. Long Term Plan

- Extension of Teaching Hospital
- Provision of Mobile Health Unit for the peripheral area of Town (under supervision of district Hospital)
- Up gradation of BHUs, RHCs and MCHCs.
- Health awareness programme for the deprived population
- Research and development programme for doctors and paramedics staff
- Provision of diagnostic facilities, ambulance, pharmacy in all hospitals
- Tertiary Level Specialized Hospitals to cater District

[30] Sindh Vision 2030

- Enhancement of Mobile Health Unit for far-flung areas of the District
- Accommodation facilities for Doctors and Paramedic Staff

ii. **Short Term**

- Improve access to healthcare facilities as due to long journeys to hospitals many patient die on the way.
- We can further improve the access through ambulance network
- Ensure availability of adequate and skilled workforce to fulfill population health needs,
- Improving functionality of equipment and availability of quality medicines.
- Health is the fundamental need of the people. Currently health institutes of District are facing lot of problems due to unavailability of Laboratorial facilities. Shortage of Specialized doctors, surgical instruments, and lack of machinery are the major issues. The condition of BHUs and RHCs are also very poor, there should need to be rehabilitation of these institutes to provide sufficient and high quality health to the people.

### *6.2.8* Priority Projects

**i. Provision of Missing Facilities at Civil Hospital**

- **Project Justification**

  Health is the fundamental need of the people. Currently health institutes are facing lot of problems due to unavailability of Laboratorial facilities. Shortage of filled doctors, surgical instruments, and lack of machinery are the major issues. Lake of female doctors and female staff. And the condition of BHUs and RHCs are also very poor, there should need to be rehabilation of these insitutes to provide sufficent and high quility health to the people of Tando Mohammad Khan.

- **Project Benefits:** This project will provide high quality health facilities and free medicines to the people of District Tando Mohammad Khan.

- **Implementing Authority:** Government of Sindh - Health Department

- **Estimated Cost: 15**0 Million PKR Approx. (Short Term)

| Project Name | Short Term | Proposed Area (acre) & Lengths (m) | Preliminary Cost (million /- PKR) | Justification |
|---|---|---|---|---|
| Provision of Missing Facilities at Civil Hospital | Short Term | 7.67 acre | 150.00 | Provision of pharmacy, diagnostic and ambulance facilities and installation of incinerators. |

**Proposed Health Landuse for Tando Muhammad Khan Town**

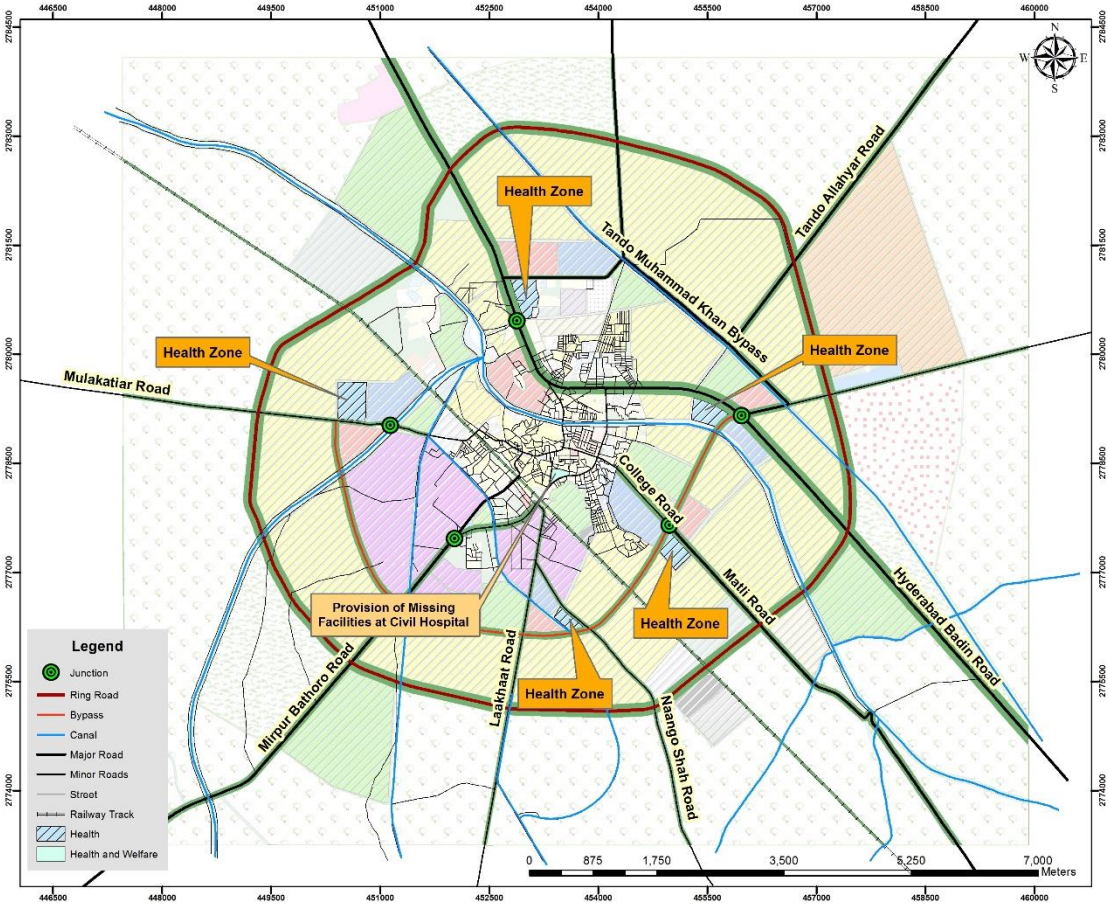



**Figure 6-6: Educational Proposals for Tando Mohammad khan**

### *6.2.9* Immediate Action Plan for Core Urban Area

➢ **Repair and Rehabilitation of DHQ Hospital Tando Muhammad Khan**

- District headquarter Hospital Tando Muhammad Khan is fully functional with lack of basic facilities like; unavailability of incinerator, waiting area for patients, Basic Laboratorial facilities, shortage of doctors' & para medic staff.
- Provision of Emergency transport facility (Ambulances) for DHQ
- Provision of mother & child care wards with allied facilities
- Blood bank, additional beds, pharmacy, ambulance service, 24/7 service with specialized doctors and paramedic staff.

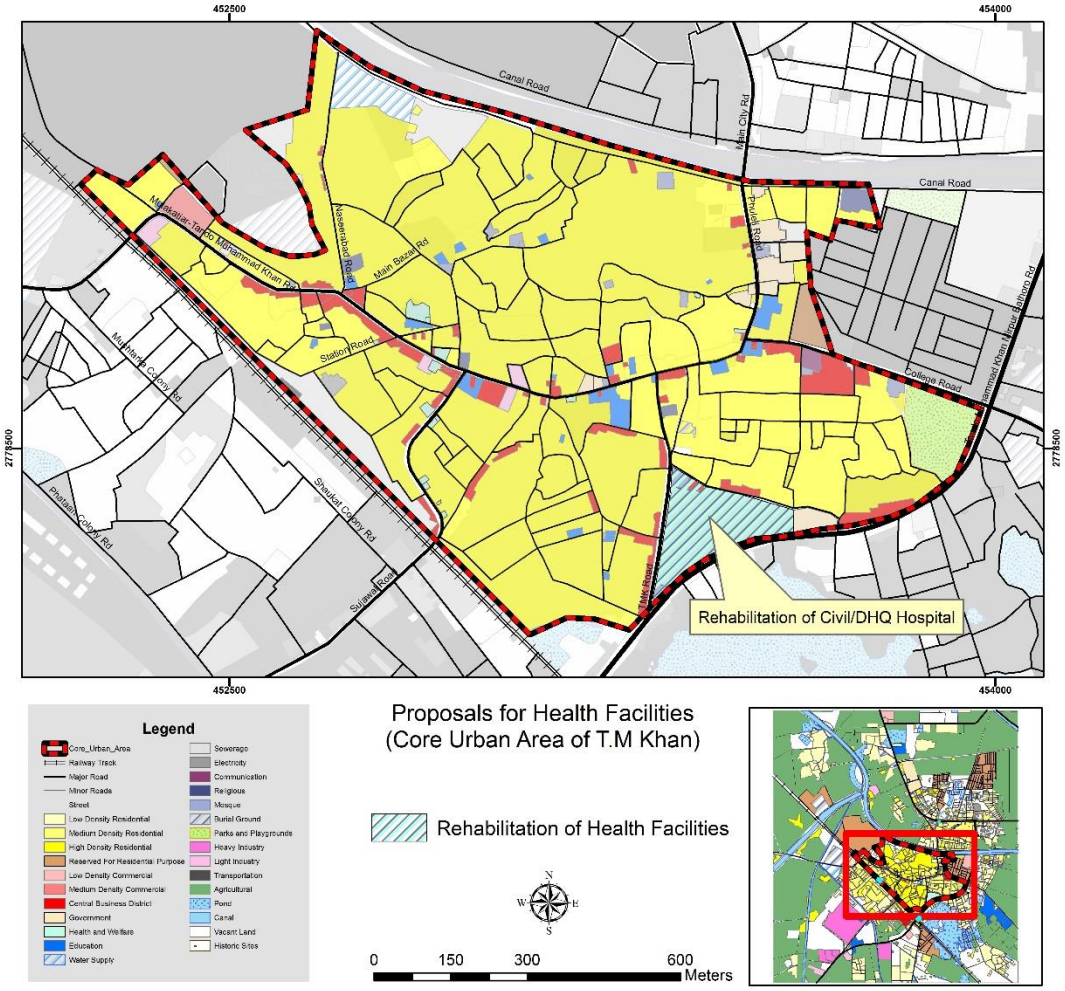



**Figure 6-7: Rehabilitation of Health Facilities Core Urban Area of Tando Muhammad Khan**

| Tando Muhammad Khan - Core Town Area Rehabilitation Of Civil Hospital | | | | | | |
|---|---|---|---|---|---|---|
| S. No | Area / Locality / Address | Area (acre) | Rehabilitation Required, Activity Wise Cost (PKR) | | | |
| | | | Street / Road / Parking | Provision of all 4 utilities | Public Facilities | Security |
| 1 | Rehabilitation of Civil Hospital | 7.67 | **7.67** | **4.96** | **9.59** | **1.92** |
| **Total** | | | **7.67** | **4.96** | **9.59** | **1.92** |
| **Total PKR Rs. Million** | | | **24.14** | | | |

## 6.3 Recreational/Tourism/Culture

Recreational and entertainment are necessary for the mental, physical and spiritual development of a community .Recreation can be active like organized sports or passive like breathing in a fresh air or standing in a green landscaped park with friends and family

### *6.3.1* Existing Situation

One of Tando Muhammad Khan's valued heritage sites is the Budhist Stupa (Sudheran jo Thull). The stupa lies between Khatter and Tando Muhammad Khan Railway Station on Kotri-Badin Branch lime and is about 5 miles from Tando Muhammad Khan. It is near the Railway line and is visible from it. Regardless of the type of recreation, leisure is an important part of a functioning society. It allows its civilians to lead healthy and balanced lives apart from work and school while enhancing the cultural and physical landscapes and adding to a city's economy. Since people differ in their leisurely needs, according to their preferences and physiological and sociological needs, it is then vital that the Tando Muhammad Khan be concerned with the identification and provision of such services that can benefit the whole society.

**Figure 6-8: Park in TMK**

While planned open spaces are provided for Tando Muhammad Khan and are designed for either passive or active entertainment, incidental open spaces also hold significance as they can help introduce breaks in what would otherwise become uninterrupted development. In small urban centers, such as TMK, the disappearance of such incidental open spaces and the lack of unplanned open spaces is a major problem

when densities become high, the fringe of built-up area is farther from the average resident, and land pressure is greater. It should then be stressed for a need to preserve and provide open spaces despite the pressure from other land-use demands.

**Recreational Spaces in Tando Muhammad Khan**

There are only 3 parks in the town of Tando Muhammad Khan having an area of about 8.57 acres. These may hardly be classified as proper recreational facilities as per standard requirement

**Historical / Famous Places in Tando Muhammad Khan District**

- Mir Ghulam Ali Khan Talpur Municipal Park, Tando Muhammad Khan
- Shaheed Benazir Bhutto Park, Tando Muhammad Khan

**Shrines / Darghas in Tando Muhammad Khan District**

- Dargha Sain Abdul Fatah Shah, at UC Tando Saindad, Taluka T.M.Khan
- Dargha Hyder Shah Bukhari, at UC Lakhat, Taluka T.M.Khan
- Dargha Dullah Shah, at Jurai Shah, Taluka T.M.Khan
- Dargha Sabhago Faqeer, at Behrani Muhalla, T.M.Khan
- Dargha Shaikh Fareed at UC Lakhat, Taluka T.M.Khan
- Dargha Burhan Shah, at UC III, Taluka T.M.Khan
- Dargha Jumman Shah, at UC I, Taluka Tando Muhammad Khan
- Dargha Malook Shah, at UC I Taluka Tando Muhammad Khan
- Dargha Sain Ibrahim Shah, at UC I, Taluka Tando Muhammad Khan

### *6.3.2* Issues/Problems

- Disappearance of incidental open spaces
- Lack of preservation of recreational spots
- Lack of planned open spaces is a major problem.
- In-active tourist development program
- Tourism marketing is weak.
- Unavailability of basic facilities
- Encroachments
- There is no playground available for sports in core urban area, youngsters are forced to play on Burial grounds and vacant land etc.

### *6.3.3* SWOT Analysis

| STRENGTH | WEAKNESSES | OPPORTUNITY | THREATS |
|---|---|---|---|
| **SPORTS AND RECREATION** | | | |
| 1. Local environment of town supports green urbanism. | 1. Shortage of water facility to maintain green spaces, green belts and trees plantation.<br>2. Unavailability of sports infrastructure.<br>3. Shortage of Parks | 1. Good health of local communities.<br>2. Air pollution reduction.<br>3. Healthy environment.<br>4. Protection of natural habitat. | 1. Give birth to passive recreation.<br>2. Obesity. |
| **CULTURE** | | | |
| 1. The indigenous cultural activities of various social groups and minorities comprises many events that attract people from its surrounding localities.<br>2. Strong potential for producing culturally ornamented products used in daily life. | 1. Poor Management for organizing cultural events<br>2. Lack of infrastructure to accommodate visitors into such events.<br>3. Lack of opportunities to commercialize / merchandize cultural goods | 1. If organized appropriately could generate handsome amount of revenues with other spin-off effects. | 1. Security Threats<br>2. Demise of cultural values and norms. |
| **TOURISM** | | | |
| 1. Availability of heritage sites.<br>2. There are many places of historical significance and there are many shrines/ Dargahs in TMK. | 1. Less commercialization from tourism point of view.<br>2. Less heritage preservation. | 1. Tourist attraction.<br>2. Revenue generation through tourism planning.<br>3. Promotion of rich heritage to increase historical importance of town. | 1. Fewer opportunities for active commercial retail.<br>2. More influence on new generation of tourism for graveyards may cause passive development of adolescent minds. |

### *6.3.4* Policy Guidelines[31]

- Federally-managed lands and waters afford critically needed opportunities for outdoor recreation,
- Diverse recreation opportunities on Federally-managed lands and waters are an important complement to recreation opportunities on state and adjacent lands,
- Providing enhanced and expanded opportunities for outdoor recreation can be done within the provisions of existing, multiple-use;
- TMK needs infrastructure and programmes for sports activities, sport confections, gymnasium and family parks, and children play area and gardens.
- Preservation and conservation measures for historic places
- Formulation of comprehensive plan for promotion of tourism

### *6.3.5* Strategic Development Plan

**Canal Beautification**

For the beautification of canal (Phuleli canal and Guni Branch canal), footpaths and walk ways should be constructed and benches should be fixed on the banks of canals to turn them into recreation spots for the locals and to this effect design should be prepared in collaboration with the irrigation department.

Similarly, food courts will be set up in various places along the canal bank, while spots should be identified for the purpose. Green belt should also be provided for the purpose of facilitating pedestrian movement. Moreover embankments should be reinforced.

For the beautification of canal passing through the city wondrous pathways and vistas can be created along the bank of the canal .Providing Soothing distant tourism opportunity to capture the beauty but not destroy it through increased impact on ecosystem, this can be done by creating a buffer area

**i. Long Term Plan**

- Provide Recreational Infrastructure of International Standards at District, Protect and conserve the cultural heritage, promote language, art and culture of District and dissemination of information through media.
- Youth development programme for sports and recreation.
- Promote tourism through provision of support facilities.
- Preserve the historical and religious sites in TMK according to conservation principles.
- Establishment of new open spaces as well as establishment of indoor and outdoor game facilities.

[31] NOPRA 2005

**ii. Short Term Plan**

- Existing open spaces in core urban area should be restored and maintained. New open spaces should be identified and created.
- The old houses marked for demolition by Municipal Committee due to danger may be purchased by MC or Local CBO. They may purchase these old houses which have out lived its age and these houses can be converted into small parks
- Development and preservation of cultural heritage
- Rehabilitation and construction of family parks and playground near residential areas
- Construction/Rehabilitation of Recreational Facilities'.
- Construct More Parks And Rehabilitate The Available Parks To Facilitate The People
- Construction of auditoriums and up-gradations for art councils
- Proposal of new graveyard on southern side along the Sujawal road.
- Establishment of synthetic grounds, playing turf (for hockey, football) and indoor gym facility.

### *6.3.6* Priority Projects

**Repair, Rehabilitation and Construction of Recreational Facilities at Tando Mohammad Khan**

**i. Construction of Multipurpose Sports Grounds / Stadium**
**ii. Repair and Rehabilitation of Shaheed Benazir Bhutto Park**

- **Project Justification**

  Tando Mohammad Khan town is significantly deficit in Recreational facilities, there are only two parks i.e. Mir Ghulam Ali Talpur Park and Shaheed Benazir Bhutto Park, but there is no separate park for families. There should be a Family park where people can enjoy with their families.

- **Project Benefits:** It will boost the local economic potential with significant Benefits from local to national level. It will create unique city landscape and generate number of employment opportunities.

- **Implementing Authority:** Sindh Government, Local Government and private investors

- **Estimated Cost: 214.24 Million PKR Approx.**

| Project Name | Long/ Short Term | Proposed Area in Acre | Preliminary Cost in Million | Justification |
|---|---|---|---|---|
| Construction of Multipurpose Sports Grounds / Stadium | Long Term | 6 acre | 214.24 | **A.** Spectator area 20,000 sft. Repair & Rehab; @ the rate of 2,000/ sft.<br>- Total 40.00 Million for the Construction of Spectator area.<br>**B.** Playground Area 4.0 Acres (174,240 sft, @ the rate of playground @ rate of 1000/ sft.<br>o Total 174.24 Million<br>**A+B = 214.24 Millions** |
| Repair and Rehabilitation of Shaheed Benazir Bhutto Park | Short Term | 1.5 acre | 65.34 | Repair and rehabilitation of SBB Park @ of Rs.1,000 per running ft. |

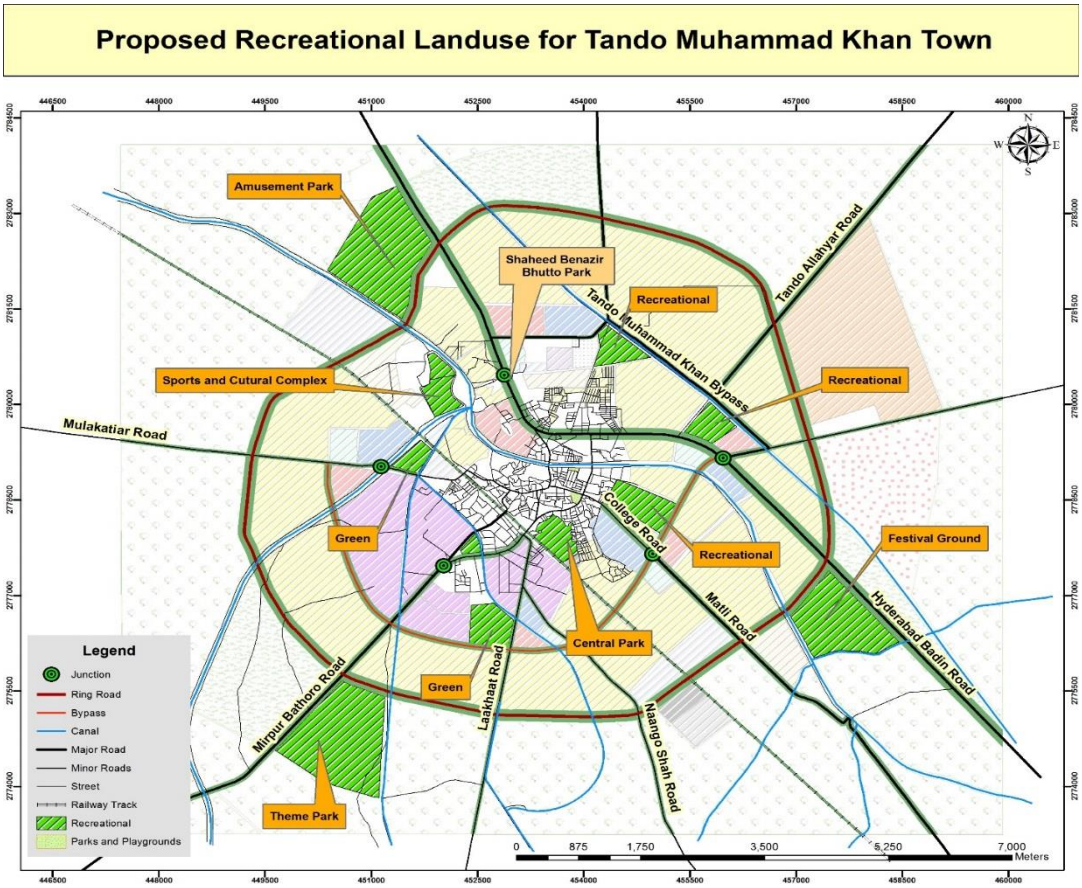



**Figure 6-9: Recreational Proposals for Tando Mohammad khan**

## Proposed Religious Landuse for Tando Muhammad Khan Town

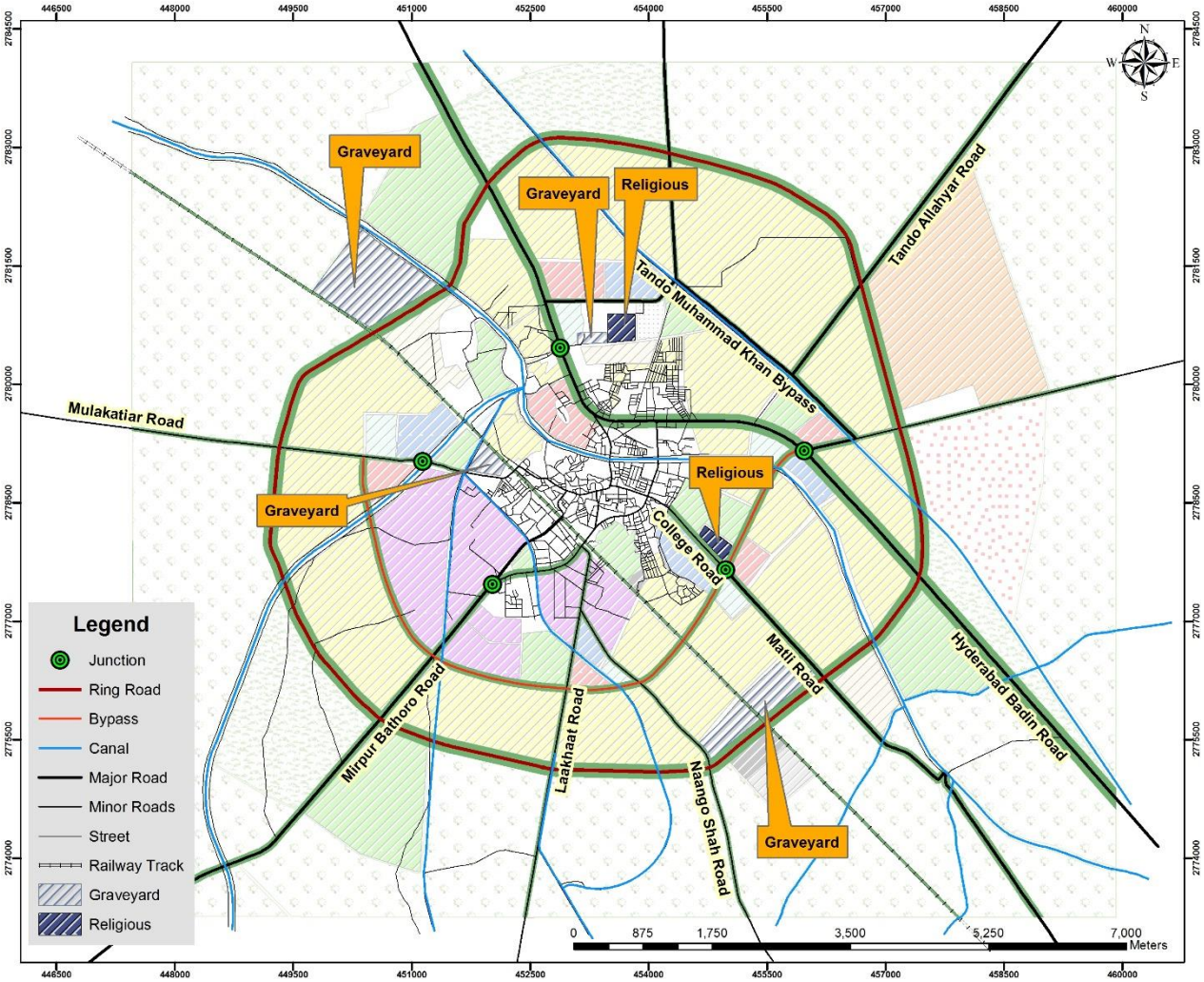



**Figure 6-10: Religious Proposals for Tando Mohammad khan**

### *6.3.7* Immediate Action Plan for Core Urban Area

- **Provision of Open Spaces, Parks and Playground**

There is an acute shortage of compulsory open spaces in core urban area of TMK. Present recreational facilities includes Mir Ghulam Ali Talpur Park should be restored and maintained for Family Park Availability of recreational facilities can be a vehicle for positive social change for youth. Promoting recreational facilities benefits beyond the traditional aspirations of improved health and wellbeing. Mir Ghulam Ali Talpur Park is located along Tando Muhammad Khan-Mirpur Bathoro Road. The park along with core urban area should be restored and maintained as Family Park.

- **Sports Facilities**

Currently, there are no sports facilities in the core urban area. New spaces should be identified and maintained for public use.

| Tando Muhammad Khan - Core Town Area Recreational Facilities Preservation | | | | | | | |
|---|---|---|---|---|---|---|---|
| **S. No.** | **Heritage / Cultural Site Name** | **Area / Locality /Address** | **Area (acre)** | **Rehabilitation Required - Area wise or job wise cost (PKR)** | | | |
| | | | | **Street / Road/ Parking** | **Utility infrastructure** | **Public Facilities** | **Security** |
| **1** | **Rehabilitation of Mir Ghulam Ali Talpur Park** | **4.70** | 4.70 | 4.70 | 5.41 | 5.88 | 1.18 |
| | | | **Total PKR Rs. Million** | **4.70** | **5.41** | **5.88** | **1.18** |
| | | | **Total PKR Rs. Million** | **17.16** | | | |

**Note:**
1. Rehabilitation of lanes, streets and connection minor and major roads.
2. Utility Infrastructure rehabilitation includes basic services of Water supply, Electricity supply and Gas supply.
3. Public facilities includes rehabilitation and provisioning of public toilets, proper seating arrangements.
4. As per the law and order situation security concerns makes the overall impact to uplift the society life w.r.t to secured environment.
5. All these basic services in every DHQ town core areas needs to be rehab for quicker revitalization of people's life.

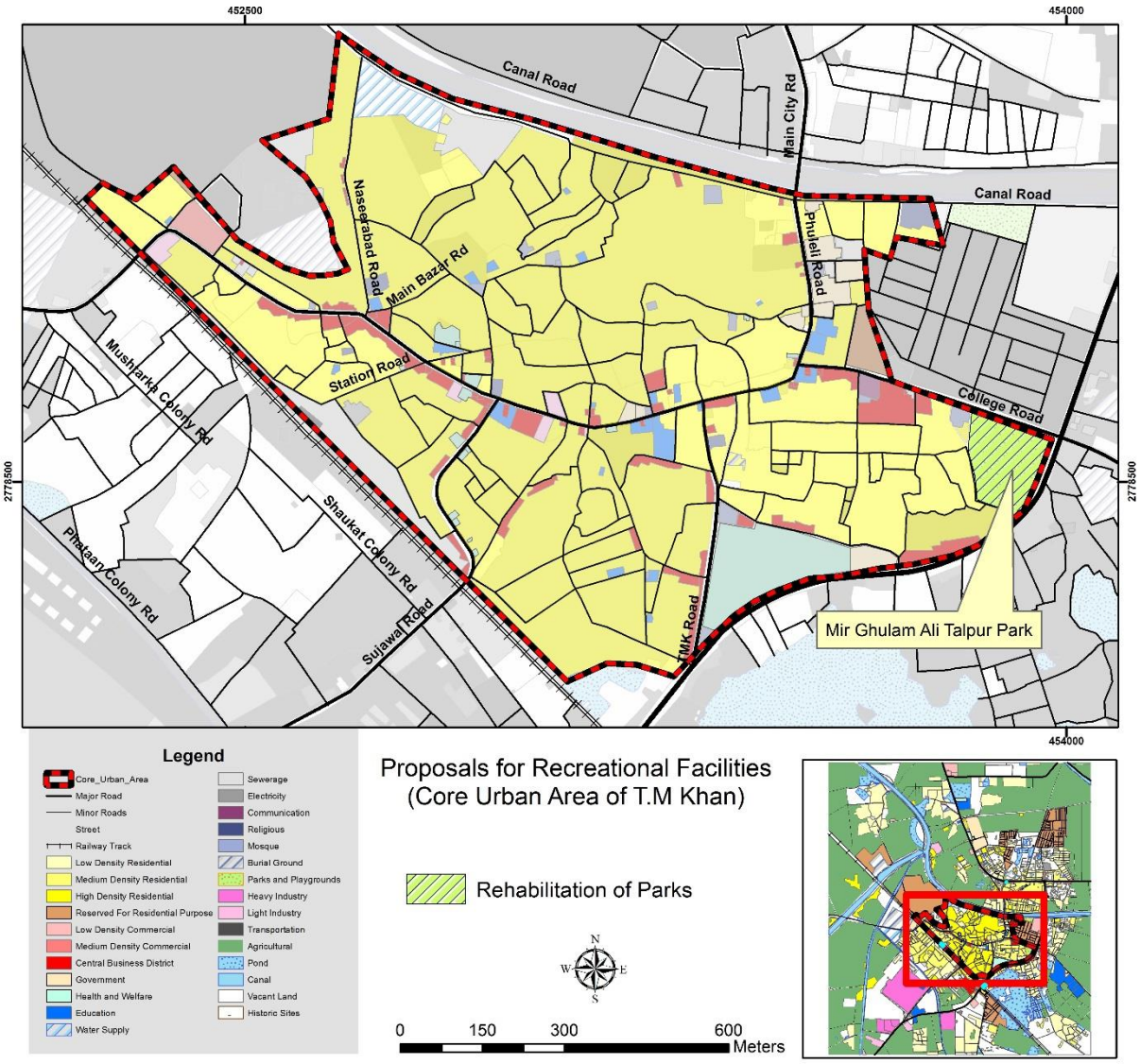



**Figure 6-11: Proposed Recreational (Core Urban Area of T.M Khan)**

# 7. ECONOMIC DEVELOPMENT PLAN

The economy of an area or town plays an important role in its sustainability and further growth. An economy can make a town a vibrant town or a rather stagnant, boring and dead one. TMK, being an Agriculture Hub has three canals i.e. Phuleli, Pinyari, and Akram Wah. It offers economic opportunities and suffers from some issues as well. The progress of economic activities in the district depends upon facilitation to farmers by using modern techniques now and surely in the future. The district as a whole is well-known for its agriculture which serves the entire Sindh by using the market of Hyderabad, which is the regional hub. It is situated on a main regional corridor which connects Badin and Mithi with Hyderabad.

## i. Policy Guidelines for Overall Economic Development

- Creating a better quality of life for the citizens of the district by encouraging private sector to invest in the district.[32]
- Increase farmer's income.[33]
- Improving infrastructure and key services necessary for economic uplift.
- Providing un-interrupted power supply.

## ii. Inclusion of Poverty Reduction Strategy in Economic Development Plan

The poverty reduction strategy (PRS) is aimed to act as medium-term instrument to address the challenge of poverty in Sindh. One of the intervention of PRS has its foundation resting on poverty reduction at the household level, together with the introduction of an urban programme incorporating a model of urban economic clusters for SME-based enterprise development in small cities and towns, and a model of rural growth centres at meso level that would provide a catalytic effect to the PRS. It has the strength to become a keystone for investment planning in the province, while focusing on Economic Development strategies via PRS lens that will boost the employment opportunities as well as enterprise development in the province.

## iii. Strategic Plan for Overall Economic Development

- Modernize and revitalize the service sector.
- Implement proactive governance centered on accelerated and balanced economic growth.
- Develop Human resources through capacity building for employment opportunities.
- Reinforce the local governance institutions.
- Modernize local / district / divisional administration.
- Decentralization of governance authorities.
- Involve community participation.

[32] ADP 20017-18 Industries Punjab
[33] ADP 2017-2018 Agriculture Punjab

## 7.1 Agriculture

### *7.1.1* Existing Situation

Agriculture is the mainstay of Pakistan's economy. More than 20% of the country's GDP comes from the agriculture sector which also employs about 41% of the labor force, sustains almost 67% of the population. This simple fact suggests that agriculture contributes less to the national GDP relative to its size of population and labor force compared to other sectors of the economy; limited information and understanding of the rural markets and economy has been one of the key impediments in penetration of banking/finance in agricultural/rural sector of our economy.

TMK contributes significantly in the agriculture sector of Sindh because its climate is suitable for the production of various crops. There are two main crop seasons; "Kharif" and "Rabi" in TMK District. The Kharif season starts from April-May and ends in October-November while the Rabi starts from November-December and ends in April-May. Crops that are cultivated in TMK are sugarcane, rice, wheat, rapeseed and mustard, cotton, jowar, maize, gram, and barley. Due to its soil and topography, TMK is an ideal place for sugarcane cultivation.

The total geographical area of District Tando Muhammad Khan is 195,000 hectares out of this cultivated area is up to 144,000 hectares. Out of cultivable land dividing 2016-17, actually cultivated to 94,000 hectares leaving 50,000 hectares as fallow. Wasteland available to 24,000 hectares, whereas, 27,000 hectares are not available for utilization.

**Table 7-1: Comparison of Land Utilization**

| S. No | Type of Cultivated area | 2012-13 | 2013-14 | 2014-15 | 2015-16 | 2016-17 |
|---|---|---|---|---|---|---|
| 1 | Cultivated area | 145,000 | 145,000 | 145,000 | 138,000 | 144,000 |
| 2 | Current Fallow | 95,000 | 92,000 | 94,000 | 94,000 | 94,000 |
| 3 | Net area sown | 50,000 | 52,000 | 51,000 | 44,000 | 50,000 |
| 4 | Cultivated Waste | 23,000 | 24,000 | 24,000 | 24,000 | 24,000 |
| 5 | Not available for cultivated | 26,000 | 26,000 | 26,000 | 32,000 | 27,000 |
| ***Source:*** *Development Statistics of Sindh, 2018* | | | | | | |

During the year 2016-17, the Production of Rice was 55,504 M.Tons, Wheat 45,092 M.Tons, Sugarcane 1,478,145 Bales and cotton 19,981 Bales, and Maize 81 M.Tons. Whereas, the crops, production field, and land utilization are given tables as under:

**Table 7 2: Comparison of Crops Production**

| Sr. No | Major Crops | 2013-14 | | 2014-15 | | 2015-16 | | 2016-17 | |
|---|---|---|---|---|---|---|---|---|---|
| | | Area | Production | Area | Production | Area | Production | Area | Production |
| 1 | Rice | 15,488 | 50,753 | 16,044 | 51,803 | 11,160 | 36,384 | 17,146 | 55,504 |
| 2 | Wheat | 13,754 | 41,276 | 11,179 | 34,139 | 13,886 | 38,431 | 14,716 | 45,092 |
| 3 | Sugar Cane (Bales) | 26,800 | 1,633,540 | 26,800 | 1,430,470 | 22,124 | 1,405,261 | 23,185 | 1,478,145 |
| 4 | Cotton (Bales)) | 4,378 | 27,774 | 4,260 | 24,022 | 3,742 | 17,041 | 4,219 | 19,981 |
| 5 | Maize | 54 | 57 | 66 | 69 | 70 | 75 | 77 | 81 |

**Source:** Development Statistics of Sindh, 2018

### *7.1.2* SWOT Analysis

| AGRICULTURE | | | |
|---|---|---|---|
| **Strength** | **Weakness** | **Opportunity** | **Threats** |
| 1. Agriculture based economy.<br>2. Strong network of distribution of agro based products. | 1. Shortage of technical and home based industry.<br>2. Low demand of home grown food products.<br>3. Less revenue generation by local government. | 1. Job opportunity for rural population.<br>2. Healthy population<br>3. Strong transport system<br>4. Outside investors show interest in agriculture sector. | 1. Shortage of educated and skilled professionals.<br>2. Less efficient local markets.<br>3. High land prices. |

### *7.1.3* Issues/ Problems

- High price of Inputs (Fertilizers Material, Pesticides and Quality seed)
- Low price of crop production
- Absence of Farm to market road
- Lack of property certified and improved seed
- Lack of agriculture credit facilities
- Absence of Agriculture research centres
- High rate of diesel
- Shortage of food godowns and warehouses.
- Insufficiency of covered storage.

### *7.1.4* Strategic Development

**i. Long Term**

- Agricultural technology development, dissemination and adoption.

- To address the property issue / raising of income level ,waste land available should be granted to land less
- Enhancing crop productivity through adoption of new technologies

**ii. Short Term**

- Modernize and revitalize agriculture.
- Modernize Agriculture extension services.
- Use of modern techniques for cultivation by choosing healthy seeds and fertilizers for increasing yield per acre.
- Increase the supply and quality of agricultural crops
- Provision of warehouses for storage of agricultural products
- Establishment of cool chain facility.
- Enhancement of the storage capacity.
- Provision of warehouses, food gowdowns for storage of agricultural products.
- Construction of covered gowdown.

**Proposed Agriculture Landuse for Tando Muhammad Khan Town**

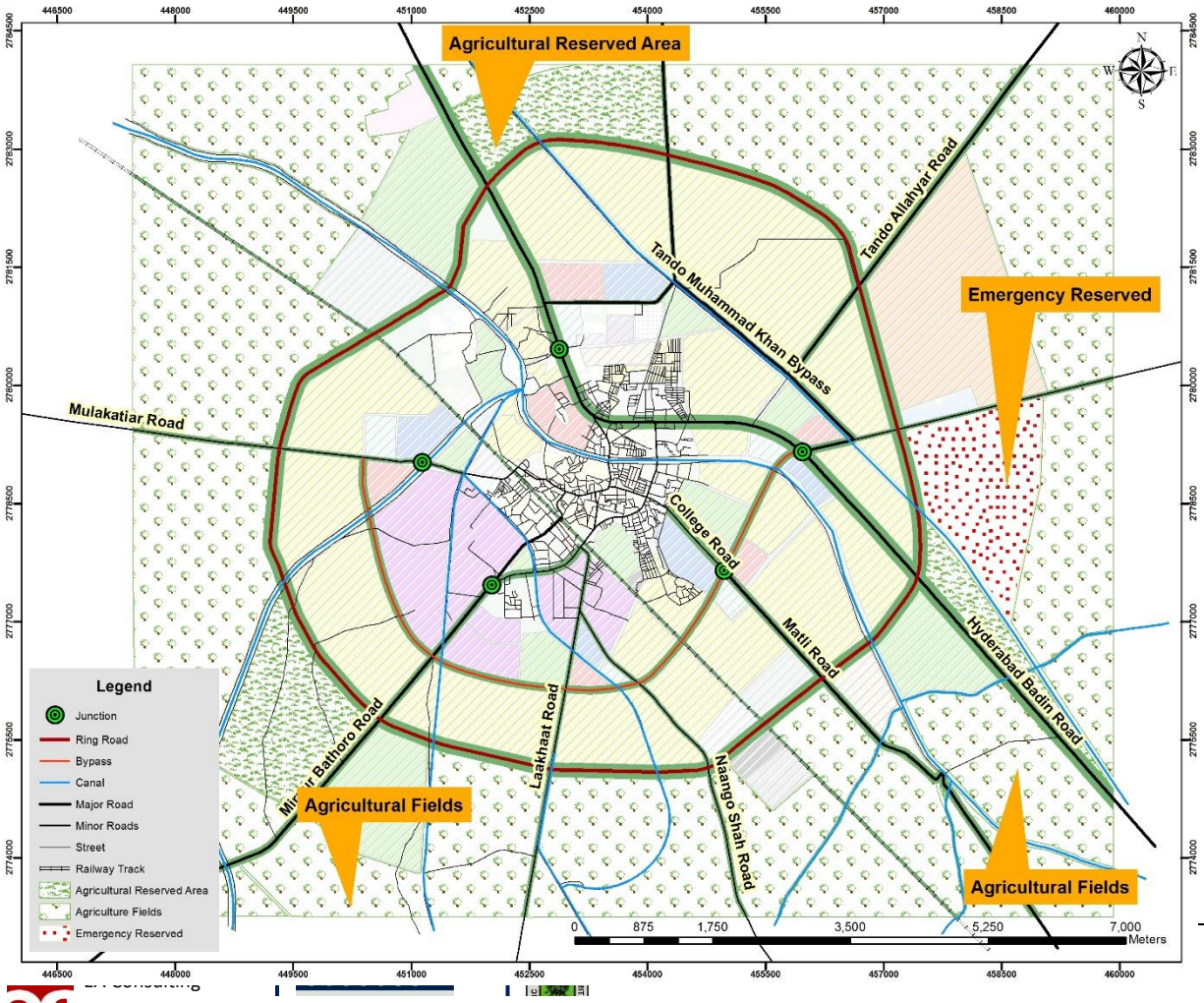



**Figure 7-1: Agriculture Proposals for Tando Mohammad khan**

### *7.1.5* Economic Development

Recommendations for Agriculture Sector

In order to improve the agriculture sector, the intervention from government departments are needed in the following areas.

- Agriculture credit facilities
- Regular Supply of irrigation water
- Availability of Fertilizer, pesticides and quality seed
- Tube well installation facilities
- Irrigation and drainage system to decrease in water logging and salinity
- Construction of farm to market roads
- Continuous agriculture research and capacity building to farmers
- Potential area for investment through private and public sector partnership can include following areas
    - Corporate Farming
    - Seed Production and Processing
    - Agri Mechanism
    - Modern Cool Chain System
    - Combined Harvester
    - Agriculture Extension and Water Management
    - Improvement in Irrigation system by modern techniques and de-siltation of canals

## 7.2 Livestock

### *7.2.1* Existing Situation

Livestock is one of the major sub-sector of agriculture and the back bone of Sindh's economy. Its main by-products including hides and skins have substantial potential as semi-finished products. A substantial growth in Livestock products such as milk, meat, beef, mutton, poultry and eggs have been noticed since many years for the people of district Tando Mohammad Khan. This district is producing animal based food (meat & meat products) in surplus to its requirements. In the Animal population of the district, the highest number belongs to buffalos having 158,000 heads followed by goats 136,000 heads and cattle 57,000. Tando Muhammad Khan town's animal population also has 55,947 buffalos, 21,934 cattle's, 46,813goat, and 21,934 cattle's. Tando Muhammad Khan town's animal population is also comprised of buffalos 55,947, cattle's 21,934, goat 46,813, and cattle's 21,934. The Livestock is served by 4 veterinary Hospitals. Veterinary centers named by 7 doctors and 13 Paramedics.

**Table 7-2: Livestock Population**

| S. No | Livestock by Category | District Population of Livestock 2006 | Livestock Population in Town |
|---|---|---|---|
| 1 | Cattles | 57,000 | 21,934 |
| 2 | Buffalos | 158,000 | 55,947 |
| 3 | Sheep | 24,000 | 9,540 |
| 4 | Goats | 136,000 | 46,813 |
| 5 | Camels | 2,000 | 320 |
| 6 | Asses | 8,000 | 3,509 |
| 7 | Poultry | 239,000 | -- |

*Source: Development Statistics of Sindh 2018/ Livestock Department TMK, 2018*

**a. Veterinary Services**

The veterinary services in district Tando Muhammad Khan are deficient because the District is a richly populated area having animal's population of large and small animals. For this population of Animals, the services are not sufficient and not serving all population of animals. Moreover, the secondary data reveals the numbers of services for veterinary in the district, there are 4 hospitals and 11 various veterinary centers are operational in district Tando Muhammad Khan. The number of doctors working in these hospitals and centers is 7 with 13 paramedics, besides this 7 more positions are vacant of paramedics. Main veterinary centres includes; Veterinary Center Sheikh hirkio, A.I Center Sheikh Bhirkio, Veterinary Center Kouro Khan Lahari,, Veterinary Center Ghulam Mustafa Shah, Veterinary Center Janhan Soomro, A.I Center Bulri Shah Karim Reed Sindhi Cattle Farm, Research Training Institute, A.I Center Mulakatiar, Animal Health Extension Rajo Nizamani, Veterinary Center Hafiz Shah, Veterinary Dispensary Tando Muhammad Khan and Veterinary Center Rabdino Notkani

**Table 7-3: Veterinary Service**

| Sr. No | Items | Numbers |
|---|---|---|
| 1 | Veterinary Hospital | 4 |
| 2 | Veterinary Centers | 11 |
| 3 | Veterinary Doctors | 7 |
| 4 | Veterinary Paramedics | 13 |
| 5 | Veterinary Paramedics Positions vacant | 7 |
| 6 | Animal Treated | |
| A | Vaccinated | 895,421 |
| B | Treated | 15,017 |
| C | Castrated | 2,351 |

*Source: Development Statistics of Sindh 2018/ Livestock Department, 2017*

### *7.2.2* Issues and Problems:

- Landlessness and small holding prevents the farmer to raise livestock on commercial basis mainly subsistence farming
- Limited knowledge and facilities
- Almost for every farmer, livestock farming is a secondary activity so treated as secondary source.
- Reduced areas for natural grazing and feed production in the face of increasing urbanization and food security requirements

### *7.2.3* Need Assessment

Improvement in Cattle Farms and Veterinary services would be needed to maintain the sustainable growth by Livestock Department along with private sector. Livestock in the district suffers in particular from shortage of high quality feed.

### *7.2.4* Strategic Development

- Improving the production performance of livestock in District through manipulation of different minerals and feed supplements.
- Enhancement of Livestock Production and Productivity through strategic deworming and vaccination.
- Establishment of model livestock farms linked with improved supply chain and value addition.
- Establishing new cattle & dairy farms that lead to increase in number of cattles and quantity of milk.
- Enhancing Veterinary Services.

## 7.3 Fisheries

### *7.3.1* Existing Situation

There are 98 private fish production Farms in TMK District. There are 215 fish farms in which 215 fishermen are experiencing their luck and 35 are the fish dealers in Tando Muhammad Khan. These fishermen are earning their wages by utilizing 10 sailboats and 20-rowboats and annual fish production is 397.47 M.tons.[34]

[34] Fisheries Department TMK

| Table 7-4: Water bodies, Fish farms & Production in Tando Muhammad Khan | | |
|---|---|---|
| 1 | Public Water Area | |
| | Canals | 57 kms |
| | Drains | 82 Kms |
| | River | 30 Kms |
| 2 | Number of Fisherman's | 215 |
| 3 | Number of Boats | 30 |
| 4 | Number of Private Sector working in Fish | 98 |
| 5 | Area under Fish Farming Public and Private | 3049 hectares |
| 6 | Annual Fish Production | 396.47 (M. Tons) |
| **Source: Fisheries Department Tando Muhammad Khan** | | |

### *7.3.2* Issues

- To provide the extension services in private sector
- Lease of fishing rights, conservation, management and promotion of fisheries
- Training through open training schools
- Issuance of district angling licenses
- Local publicity and awareness
- Enforcement of fisheries enactment in their respective domain
- Fish seed stock replenishment in natural water bodies in their respective domain
- Aquaculture development activities through modern techniques
- Collection of statistical data of fish and fish resources in their respective domain

### *7.3.3* SWOT Analysis

| LIVESTOCK & FISHERIES | | | |
|---|---|---|---|
| **Strengths** | **Weakness** | **Opportunity** | **Threats** |
| 1.Local skills and vet services available<br>2.Mechanism for milk collection available<br>3. Favorable environment is available for livestock growth (Pasture) and poultry farming in surroundings of city. | 1. Large scale breading has not developed<br>2. Lack of facilities to industrialize livestock based products. | 1. Cooperative dairy farming and in-land fisheries has sufficient scope<br>2.Large pasture land and labor force available for livestock growth<br>3. Livestock based products can enhance economic activities if produced through appropriate industries. | 1. Theft and security issues<br>2. Losses due to Disasters (floods and epidemics). |

### *7.3.1* Need Assessment

There is need to develop and implement a broad-based fisheries policy which is required for accelerated development of the fisheries sector. Government of Sindh has to take measures to modernize the fisheries sector including establishment of farms on district level to promote fish farming.

### *7.3.2* Strategic Development Plan

- Need for extension services in private sector
- Lease of fishing rights, conservation, management and promotion of fisheries
- Local publicity and awareness
- Enforcement of fisheries enactment in their respective domain
- Fish seed stock replenishment in natural water bodies in their respective domain
- Aquaculture development activities through modern techniques
- Collection of statistical data of fish and fish resources in their respective domain

### *7.3.3* Economic Development

It is expected that sustainable growth of livestock will be maintained as per objectives of Livestock & Fisheries Department with the participation of private sector. Hence there is possibility for increasing number of livestock and dairy farms to meet the requirement of meat and milk. Similarly new fish farms and poultry farms in the districts need to be established to generate production and income of the people engaged in this business.

Since Tando Muhammad Khan is not only an agricultural and industrial town, local inhabitants rely on livestock for another source of income. In this regard livestock zone is placed in northeast direction along Tando Allahyar Road, to promote livestock production. The main emphasis is to be given to cattle production and their required facilities and services. In addition poultry is another requirement to fulfil through the livestock zone, while Fish farms need to be identified by concerned authority to attract the private investment, where water is available.

## Proposed Livestock Landuse for Tando Muhammad Khan Town

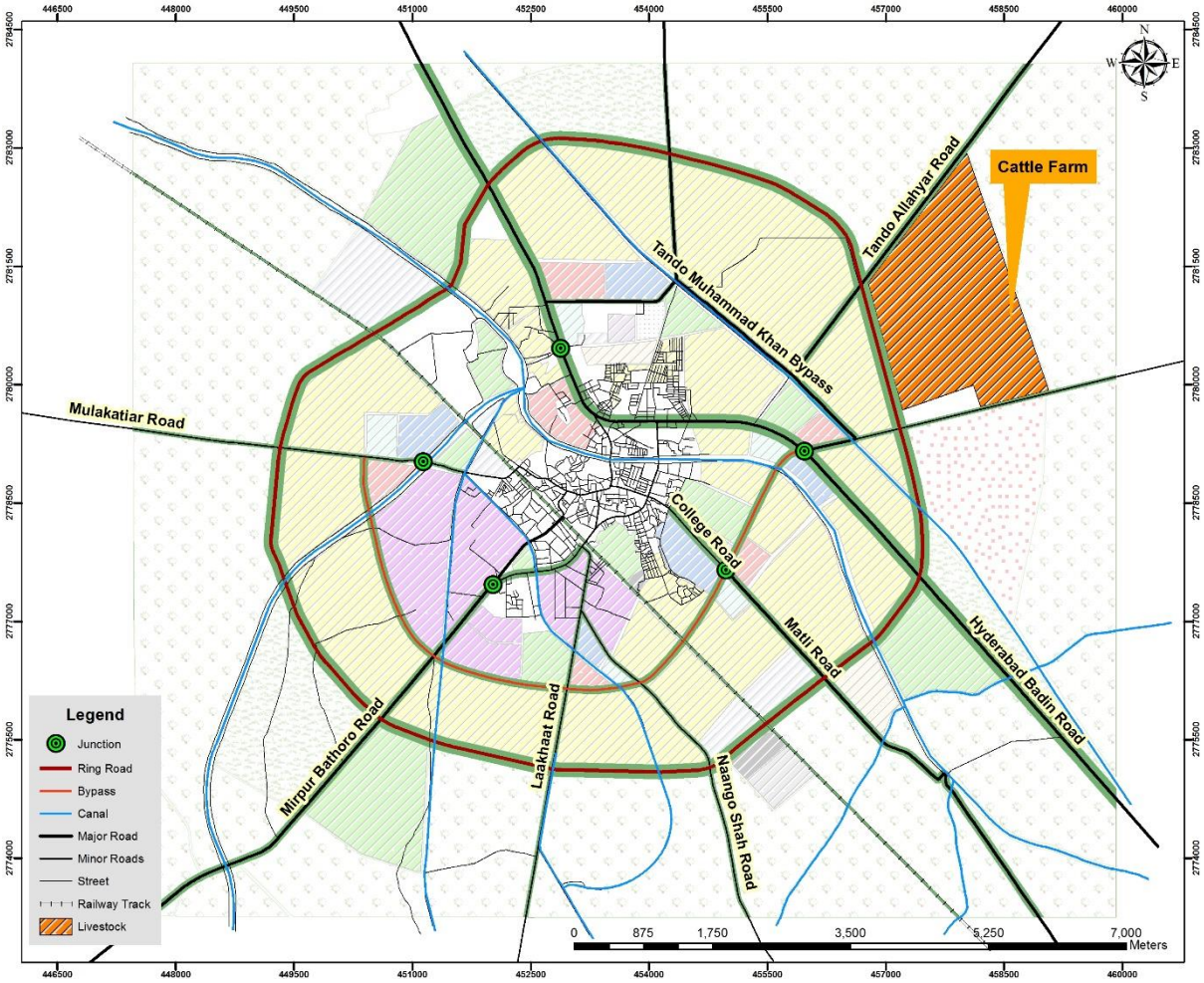



**Figure 7-2: Proposed Landuse for Livestock Related Activities for Tando Mohammad khan**

## 7.4 Industries

### *7.4.1* Existing Situation

Tando Muhammad Khan is primarily an agro-based district and the industrial base in this district is dependent on the agriculture. This district has established industries which are related to the agriculture i.e. the raw material, for these industries, is provided by the agriculture sector. Besides, this district is the second largest Ajrak in Pakistan. So a huge small scale *Ajrak* making industry is well established in this district. Besides there are sugar mills, flour mills, and rice mills in this district.

### *7.4.2* Types of Industries

Tando Muhammad Khan is primarily an agro-based district and the industrial base in this district is dependent on agriculture. This district has established industries that are related to agriculture i.e. the raw material, for these industries, is provided by the agriculture sector. Besides, this district is the second largest Ajrak making industry in Pakistan. So a huge small scale Ajrak making industry is well established in this district. Besides there are sugar mills, flour mills, and rice mills in this district.

**Table 7-5 : Existing Industrial units at TMK District**

| Industry | Units |
|---|---|
| **Sugar Mills** | |
| **T.M.K. Sugar Mills (Non- Operative)** | 1 |
| **Faran Sugar Mills** | 1 |
| **Ansari Sugar Mills** | 1 |
| **Sindh Abadgar Sugar Mills** | 1 |
| **Abadgar Sugar Mills** | |
| **Flour Mills** | 18 |
| **Rice Mills** | 20 |
| **Cottage/Ajrak Industries** | 81 |

### *7.4.3* Occupation

The main occupations of the people of District TMK are agriculture, trade, labor/skilled labor, prominent educationists, agriculturists, professionals like doctors, technical experts especially in the field of sugar industry, oil exploration, lawyers, planners, housing experts are playing their prime role in the development/economic activities of the district. The occupational involvement in the industry is also overwhelming. A considerable segment of society adopts government/private service as their occupation. According to socio economic survey results the main occupation of people of DHQ town are Teacher 19%, Doctor 1%, Banker 1%, Accountant 1%, Skilled Labour 28%, Clerk 1%, Own Business 6%, Farmer 1%, Fire Brigade Helper 1%, Government Job 1%, Imamat 4%, Labor 27%, Lawyer 1%, Naib Qasid 1%, Office superintend 1% and Private Job 3%.

### *7.4.4* SWOT Analysis

| INDUSTRIAL | | | |
|---|---|---|---|
| **Strengths** | **Weakness** | **Opportunity** | **Threats** |
| 1. Strong in Sugar cane production.<br>2. Availability of Five sugar Mills<br>3. Ajrak manufacturing industry which is the trade mark of TMK district.<br>4. District TM Khan is the 2nd largest Ajrak manufacturer in Pakistan. | 1. Less job opportunities for other sectors.<br>2. Limited industrial profile.<br>3. Less job employment in agriculture sector. | 1. More international trade.<br>2. Job employment.<br>3. Based on the success story of present industries, more industries can be installed in future. | 1. Isolated economy.<br>2. Uneducated social group.<br>3. More emphasis of crop producers on sugar cane production.<br>4. Air pollution<br>5. Water contamination to river Indus resources. |

### *7.4.5* Strategic Development Plan

**i. Long Term Plan**

- Sufficient market infrastructure to ensure optimal value addition
- Development of existing planned Industrial Estates / Apparel Park / Special Economic Zone in District
- Heritage saving through empowerment of artisans for development of handicrafts
- Paradigm shift from industrial agriculture to diversified agro ecological Systems
- Provision of infrastructure for establishment of new industries.

**ii. Short Term Plan**

- Support industrial development.
- Modernize and revitalize the service sector.
- Enhancement of colonization in SIEs through provision of missing facilities
- Provision of vocational training and employable skills to the unemployed youth of the district
- Customized lending and micro financing to small industries

### *7.4.6* Priority Projects

**i. Provision of Subsidized loans for Rehabilitation of Ajrak Industry of Tando Mohammad Khan**

- **Project Justification**

Tando Muhammad Khan is primarily an agro-based district and the industrial base in this district is dependent on the agriculture. This district has established industries which are related to the agriculture i.e. the raw material, for these industries, is provided by the agriculture sector. Tando Muhammad Khan is the second largest Ajrak making district in the country. There are thirty two (32) Ajrak manufacturing workshops known as Ajrak colony in TMK Town. Sindh Small Industrial Corporation is responsible for the promoting and effectively marketing of Ajrak at the local and International levels.

- **Project Benefit**

For the people of Tando Muhammad Khan, Ajrak is not only a symbol of culture but it is also a source for subsistence and survival. A large number of people are associated with different stages of manufacturing process of Ajrak, market supply and selling of Ajrak. Tando Muhammad Khan is the second largest Ajrak manufacturing district in the country.

- **Implementing Authority**

Trades and Commerce, Sindh Small Industrial Corporation, State Bank of Pakistan

| S. No. | Project Name | Estimated Cost In Millions | ADP | Non ADP | Status | |
|---|---|---|---|---|---|---|
| | | | | | Short Term | Long Term |
| **Mineral Exploration** | | | | | | |
| **1** | Provision of Subsidized loans for Rehabilitation of Ajrak Industry of Tando Mohammad Khan | 100.00 | - | Non ADP | **Short Term** | - |

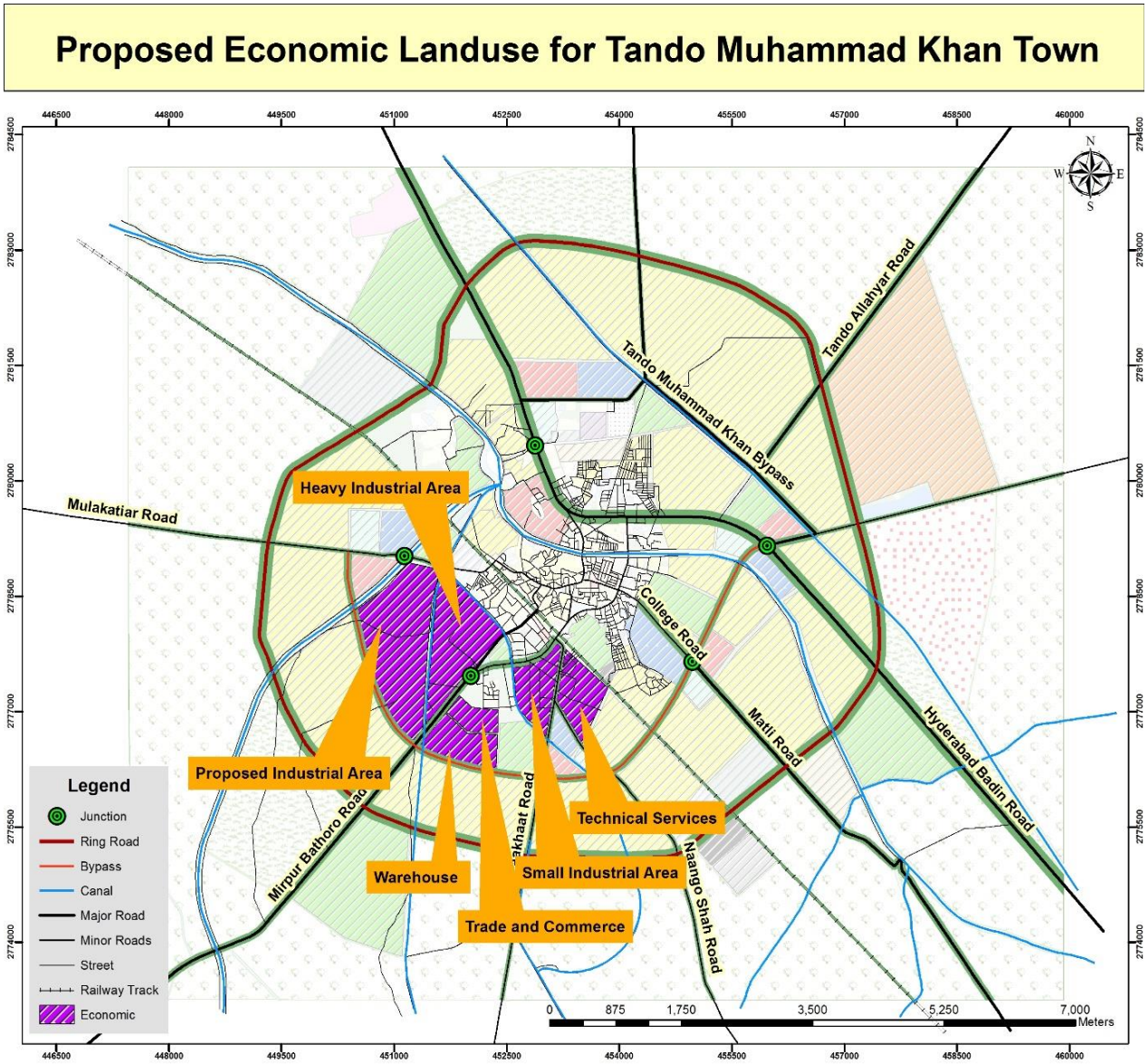



**Figure 7-4: Proposed Economic Proposals for Tando Mohammad khan**

## 7.5 Trade and Commerce

- Availability of financial institutes and Chamber of Commerce in the Town
- The district as a whole is well-known due to its characteristic of agriculture engine which serves all over Sindh by using market of Hyderabad Division, the regional trading Hub.
- Large number of local skilled artisans available.
- Strong local retail.

### *7.5.1* Issues

- The failure of PPP (Public Private Partnership) trouble for locals and government.
- Demise of local agriculture market.
- Un-planned local business activities.

### *7.5.2* SWOT Analysis

| TRADE AND COMMERCE | | | |
|---|---|---|---|
| **Strength** | **Weakness** | **Opportunity** | **Threats** |
| 1. Availability of financial institutes.<br>2. Regional trading hub.<br>3. Large number of local skilled artisans available. | 1. Demise of local agriculture market.<br>2. Un-planned local business activities. | 1. More opportunities for public private partnership.<br>2. Support to local economy.<br>3. Home grown handicrafts can be promoted through proper exposure to export market.<br>4. Large number of business interest groups. | 1. Security measures required.<br>2. Inflation. |

### *7.5.3* Strategic Development Plan

- Provision of Slaughter House
- Provision of parking for existing commercial areas
- Establishment of Fruit and vegetable market
- Specialized Wholesales market
- Construction of Building for service industry
- Provision of Cold spaces and warehouses

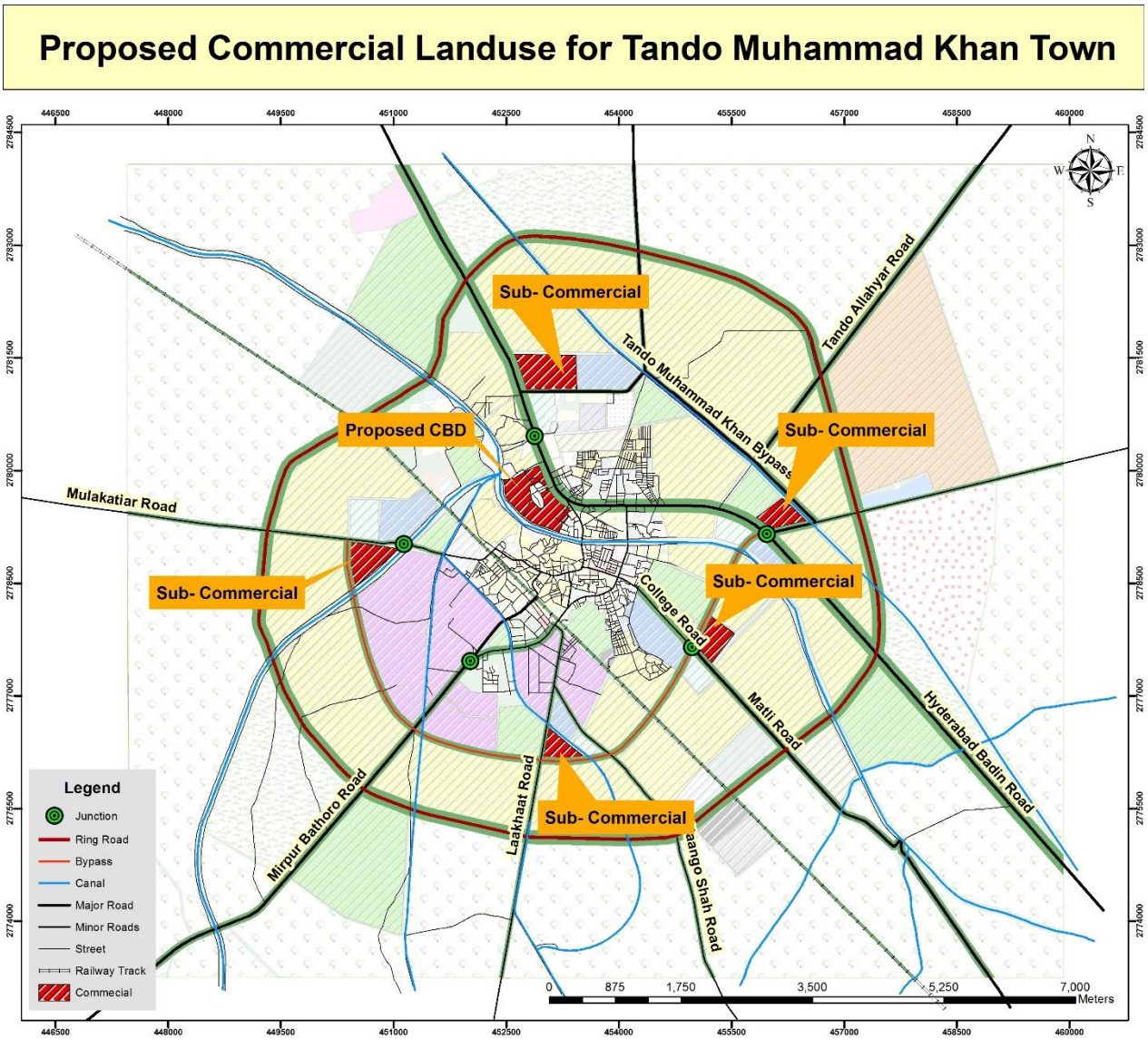



**Figure 7-5: Proposed Commercial Proposals for Tando Mohammad khan**

### *7.5.4* Immediate Action Plan for Core Urban Area

The core town area is the oldest and the most congested part of the Tando Mohammad Khan town. And facing lot of problems i.e. unavailability of footpaths, outdated sewerage system, encroachments, illegal rikshaw stands etc. main CBD is thriving trade and popular retail businesses in narrow streets and high density low rise buildings occupied by population belonging to various income groups.

The proposed projects for core urban area of Tando Mohammad Khan consists on; Removal of encroachments from town center and bazaars, created by the shopkeepers and hawkers; Rehabilitation of Main Commercial (CBD) Area, Rehabilitation & Beautification of main Bazar area i.e. Kiran Chowk, Aqsa masjid Market area /Chowk, markets along Phuleli etc.

- **Modernization of Commercial Activity in the Core Urban Area**

Tando Mohammad Khan has major commercial areas situated along Phuleli Roads which includes meat shops, book stores, marts and banks, along Mirpur Bathoro Road having hardware shops and along College Road including banks.

Immediate action plan includes;

- Rehabilitation and beautification of Bazaar area
- Provision of pedestrian facility in Bazaar area for visitors
- Banned heavy vehicles during peak hours
- Removal of encroachments

| Rehabilitation of Main Commercial Area – Activity wise cost in Millions | | | | | | |
|---|---|---|---|---|---|---|
| **S. No.** | **Area / Locality / Address** | **Area (acre)** | **Street / Road / Parking** | **Utility Infrastructure** | **Public Facilities** | **Security** |
| | | | | | | |
| 1 | **Rehabilitation of** Main Commercial (CBD) Area<br>• Rehabilitation & Beautification of main Bazar area i.e. Kiran Chowk, Aqsa masjid Market area /Chowk, markets along Phuleli etc.<br>• Up gradation & Rehabilitation of internal Bazaar roads. | **34.15** | **11.37** | **1.36** | **17.06** | **11.37** |
| **Total PKR Rs. Million** | | | **41.16** | | | |

**Note:**

- Commercial areas should be enlisted in Govt. Agency for all services of Trade, Retail, Marketing, Sale etc.
- All commercial areas security services are associated with combine effort of commercial trade union and local Govt.
- Commercial areas accessibility for daily users and marketers is well define with ease.
- Provision of pedestrian facility in the Bazaar area
- Banned heavy vehicles during peak hours
- Removal of encroachments

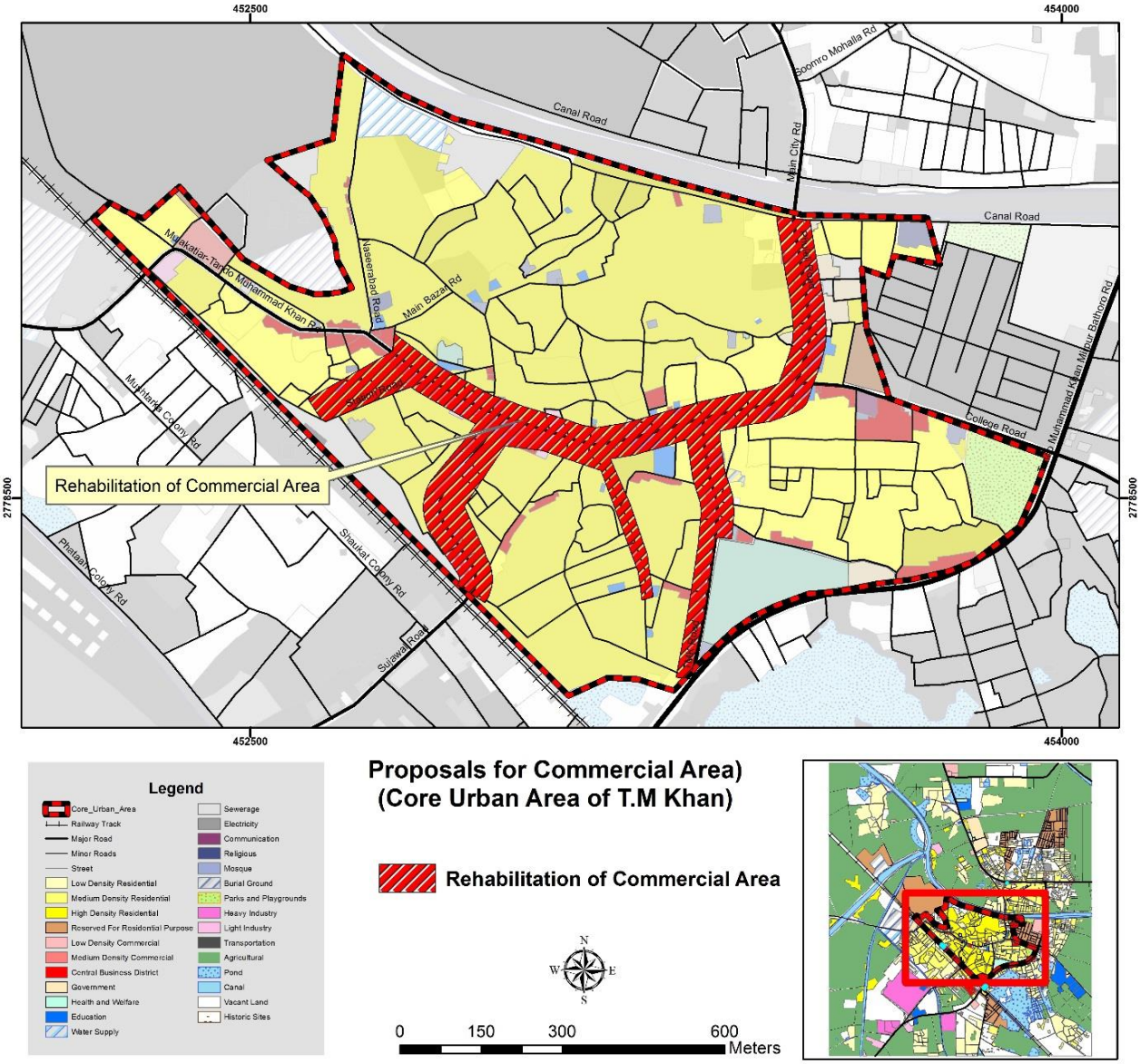



**Figure 7-6: Rehabilitation of Commercial Area - Core Urban Area of Tando Mohammad Khan**

## 7.6 Economic Development Plan of Headquarter Town with Poverty Reduction Strategy (PRS) Poverty Reduction Strategy (PRS)

Sindh province is leading the way in being the first province to have taken the bold step of formulating a specific Poverty Reduction Strategy (PRS) for the entire province, which has been approved by the Sindh cabinet on 16th October, 2018. The PRS developed is aimed to act as medium-term instrument to address the challenge of poverty in Sindh and to have a specific focus on Community Driven Local Development (CDLD). This is a logical approach for Sindh, given the GoS initiatives over the last decade in CDLD, through the Union Council Based Poverty Reduction Programme (UCBPRP).

### i. A Vision for Poverty Reduction in Sindh

The poverty reduction strategy is aimed to act as medium-term instrument to address the challenge of poverty in Sindh. As such, the long-term intentions and aspirations of the GoS in reducing poverty should be clear, with a definable 'vision' for poverty reduction and associated goals and targets to be achieved over the specified duration of the Strategy.

### ii. Poverty Reduction Strategy (PRS) Approaches

The PRS illustrates three dimensional approaches to reduce poverty at Rural and Urban Level

I. This includes continuation of People Poverty Reduction Program to carry out interventions of financial support and capacity building at grass root level
II. The second proposal entails a model of Rural Growth Centers which will serve as a business hub by clustering the geographically connected and demographically viable village
III. The third approach envisages reducing urban poverty by adding urban economic clusters and creating linkages between rural and urban poverty reduction activities

### iii. Poverty Reduction Strategies

The three key strategies of the PRS, and their core components, are:

**STRATEGY I Community Driven Local Development (CDLD) – the Foundation**

The CDLD Policy is incorporated within and is a component of the PRS continuation of a CDLD approach consists of:

- Building on and expanding the UCBPRP programme
- Mainstreaming a CDLD approach, and integration of this approach with line department activities.

**STRATEGY II Addressing Urban Poverty**

- The direction of the strategy to address urban poverty is on emphasizing ' urban within rural' – focusing on the small towns within rural areas of Sindh
- The strategy focuses on targeting employment opportunities and enterprise development
- A key approach within this is utilising urban economic clusters as a means to facilitate cooperatives in enterprise development.

Urban Income Enhancement Program and Economic Cluster

In order to address the issues of human development and poverty in districts, the policies and programs are to be developed both for rural and urban areas. These issues for the development of city have been tackled by linking with "Urban Income Enhancement Program" which emphasizes in establishment of "Urban Economic Cluster" focusing on:

- Small Enterprise Development,
- Vocational training and
- Encouraging Women Force for establishing handicrafts and cottage industry

This would lead to creating the opportunities for income generation and employment.

**STRATEGY III Rural Growth Centres, or 'Service Hubs'**

- This strategy consists of a new approach in the way forward to address rural poverty and development. This involves identification of locational focal points or villages that can serve as a centre for improved facilities and provision of services to the surrounding clusters of villages
- The intention is to consolidate services and facilities in these hubs, to provide growth and development opportunities.

Rural Growth Centre

It include the following components but not limited to

- Housing and village up-gradation (internal roads, drains, parks, Masjid)
- Commercial facilities to support local agri-based businesses and services - for example, storage facilities including refrigerated facilities for storage of agricultural inputs and outputs), distribution centers, sale outlets, bank, milk chilling plant, veterinary clinic
- High school for students from villages in the cluster
- Rural Health Centre
- Vocational centre and other community facilities, such as RSP centre
- Drinking water plants

**iv. Mainstreaming the Poverty & Policy & Program**

In order to initiate the development of a stronger economy of towns, its policies need to be embedded in sector strategies of the following departments along with Municipal Town Committees and Katchi Abadi regulators:

- Industries & Commerce Department
- Local Government Department
- Works & Services Department
- Transport Department
- Planning & Development Department

**v. Access to Micro-Finance**

Access to demand-driven microfinance provided by sustainable microfinance institutions (MFIs) has proven to be a powerful tool for poverty reduction by improving the ability of poor people to increase income, build assets, and reduce their vulnerability during periods of economic hardships.

# 8. BASIC UTILITIES

## 8.1 Water Supply

### *8.1.1* Existing Situation

The bulk of municipal water supplied to Tando Muhammad Khan is drawn from the irrigation canal, passing close to the town and comparatively much smaller part of the supplies dependent upon groundwater extraction through tube-wells. The Phuleli canal provides water for agricultural, industrial and domestic purposes to Hyderabad, Tando Mohammad Khan, and Badin districts. The Phuleli Canal of 33,000 cusecs capacity passes through the ridge of Hyderabad city, along with the Pinyari Canal on its right.

### *8.1.2* Current Water Supply / Demand

The main water supply source in Tando Muhammad Khan is Phuleli Canal and groundwater is also extracted by Farmers through Tubewells. The groundwater is mostly saline and contaminated. The secondary survey illustrates the technical capability for water supply, sewerage and drainage lie in PHED while administrative capacity lies with local government. PHED adopts a 30 gpcd standards for evaluation of present and future water demand. Water supply at present works out to 2.58 mgd (2.18+0.4). Water is stored in an underground reservoir and distributed though O/H Tanks of 50,000 gallons. Only one O/H is functional and the other is not in use. As per Collected Secondary Data, the existing Water supply to Tando Muhammad Khan MC is 2.181 mgd

#### i. Water Intake

There are two intake points located at Nasirabad / Phuleli Canal and the second connection is from Pandhi Wah. There are 6 pumping stations to supply water in Tando Muhammad Khan which are located at, 01 Phuleli canal, 02 w/w burhani shah, 01 Naseerabad Colony, 01 Akram wah, and 01 is at new sabzi mandi. Two Suction pipes of 10”dia MS pipes are connected to the pumping station at Burhan Shah and Nasirabad. It is 10”dia AC pipe embedded in the earthwork.

**Figure 8:1: Pumping room of Nasirabad Station.**

#### ii. Existing Water Works

The Water Works at Nasirabad consists of 3 Nos. settling tanks of about 18 million gallons capacity completed under Phase I (Operational but not maintained as required). The second water Works at Burhan shah was completed under Phase II having the storage capacity of 19.62 million gallon in four storage reservoirs used as settling Tanks. The third Water Work is still incomplete under Phase III which is also a slow sand filtration process with two settling Tanks of 5.39 million gallons capacity. Total storage capacity **43 million gallons** is enough for existing Tando Muhammad khan town, but for future it is necessary to expand the storage capacity of the town as per requirement.

### iii. Distribution

This intake work is withdrawing 0.4 mgd for distribution to the area and these works were completed under Phase III of water supply scheme. The second connection of 10" dia AC pipe is located at pandhi wah pumping station drawing 2.18 mgd water for distribution in the area. The overall supply from Phuleli Canal and its branch main is 2.58 mgd. Main Pumping Stations include Burhan Shah PS. (Phase I), Phuleli Canal PS. (Phase II) and Pandhi Wah PS. (Phase III non-operational).

**Figure 8:2: Pump Room of Pandhi Wah Station**

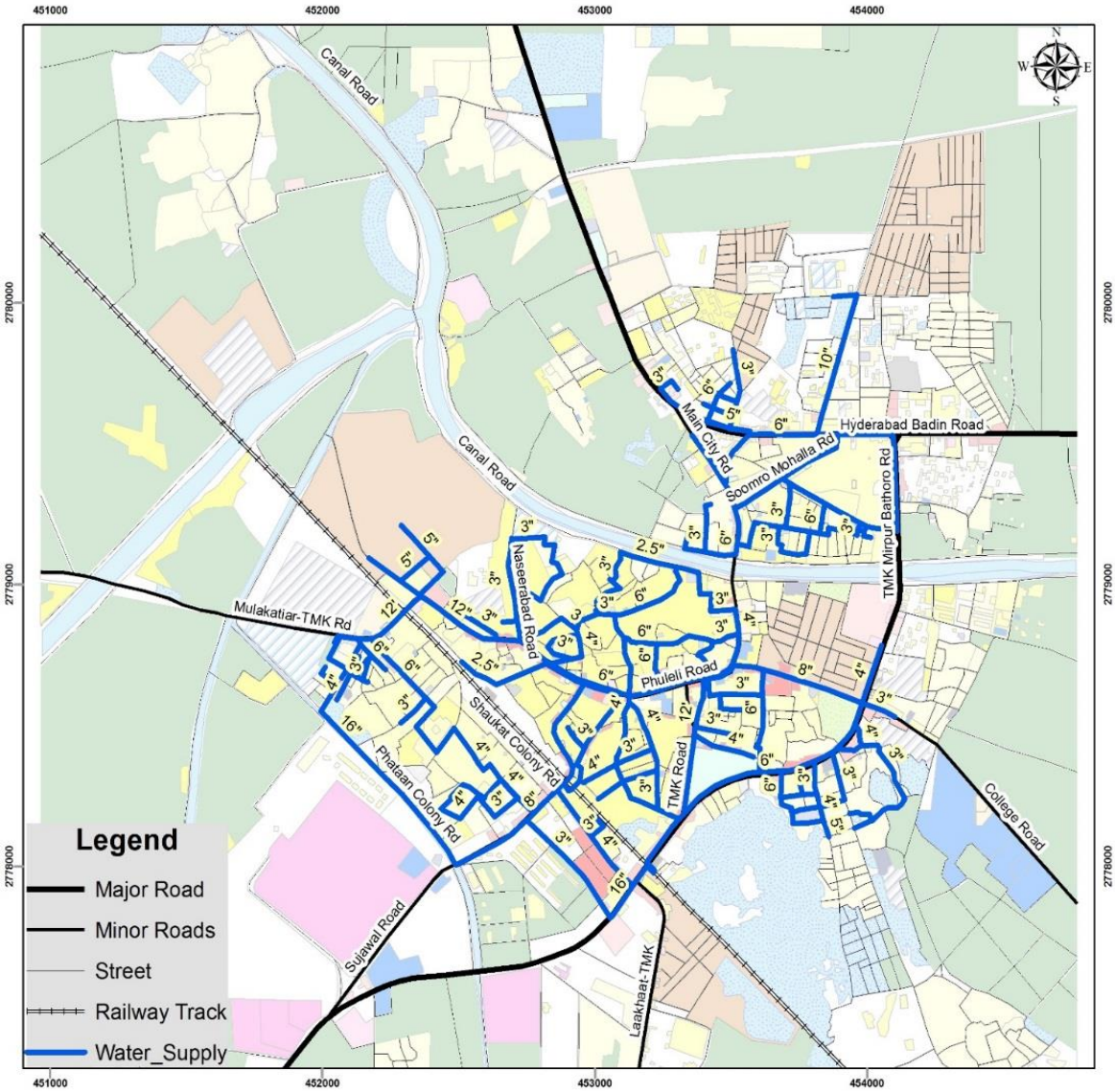



**Figure 8-3: Existing Water Supply Works in Tando Muhammad Khan MC**

### iv. Water Quality Assessment

The city's groundwater source is depleting and contaminated at present but the utility is not in a position to abandon the majority of TWs or alarm the citizens of the critical situation.

- **Surface Water Quality**

The attached sample was collected from Burhan Shah Pumping station (Surface Water). The surface water was found contaminated as per details are given in analytical report show non-compliance of WHO and SEPA standards against following parameters.

- Cadmium
- Lead Mercury
- Residual Chlorine
- Barum
- Coliforms

**Raw Sewage Discharge from Pumping Station**

- **Ground Water Quality**

The second sample was taken from the stand post–groundwater. The groundwater testing at Burhan Shah failed in following–Marginal, Cadmium, Lead, Parameters, Mercury, and Barium.

The microbiological analysis confirms presence of total colofirm, Fecal coliform and Ecoli. Test reports of Burhan Shah ground water is depicted below.

The Micro biological analysis confirms presence of total coliform and E-coli.

**Contaminant Transport Characteristics.** The presence of microorganisms in groundwater is heavily dependent upon geologic conditions such as flow pathways and mechanisms, sunlight, temperature, pH, and soil properties. The type, size, and activity of the microbial community are also important factors that influence the transport of microorganisms. So there is need to conduct the geological test of soil.

### *8.1.3* Issues

The following are issues of water supply in TMK Town:

- Weak institutional arrangements with overlapping of roles and responsibilities
- Weak coordination mechanisms
- Dysfunctional water supply schemes
- Ageing infrastructure
- Poor water quality from polluted and contaminated sources
- No operation & Maintenance practices

- High dependency on ground water which is depleting and contaminated
- Water Balancing is not possible without metering
- Unavailability of treatment plant

### *8.1.4* SWOT Analysis

| WATER SUPPLY & DISTRIBUTION | | | |
|---|---|---|---|
| **Strength** | **Weakness** | **Opportunity** | **Threats** |
| 1. Intake sources available<br>2. Most of the water supply is from surface water<br>3. Most of the town is having piped supply. | 1. Absence of systematic water supply system and treatment plant<br>2. Poor administrative setup for water supply management and distribution | 1. Adequate water resources available for water supply system development<br>2. PPP in service delivery | 1. Negative externalities on human and plant health<br>2. Depletion of water quality due to " "draw down" |

### *8.1.5* Need assessment

The current demand of the town is about 3.06 mgd while the existing supply is 2.58, there is gape between demand and supply. It is expected that the Tando Muhammad Khan MC will have population of about 162,410 Persons by 2037 and the daily demand for water for the town will increase about 4.87 for a whole-day supply. Water demand and supply has been estimated on PHED parameters is as under:

**Table 8-1: Population and Water Demand Projected up to Year 2037**

| Town | | 2017 | 2022 | 2027 | 2032 | 2037 |
|---|---|---|---|---|---|---|
| **Tando M. Khan** | Population | 101,863 | 114,463 | 128,622 | 144,532 | 162,410 |
| | Daily demand @ 30gpcd | 3.06 mgd | 3.43 mgd | 3.86 mgd | 4.34 mgd | 4.87 mgd |

*Source: Consultant's estimation based on PHED criteria*

### *8.1.6* Sindh Drinking Water Policy 2017[35]

**Principles:**

- Population should be using an improved drinking water source which is accessible i.e. located on premises, available when needed and safe that is free of faecal and priority chemical contamination.

[35] Sindh Water and Sanitation Policy 2017

- Access to safely managed drinking water is a fundamental right of every citizen and that it is the responsibility of the Government to ensure its provision to all citizens.
- Water allocation for drinking purposes shall be given priority over other uses.
- In order to ensure equitable access, special attention shall be given to removing the existing disparities in coverage of safe drinking and for addressing the needs of the poor and the vulnerable.
- A supportive policy framework shall be developed that encourages alternate options through private provision, public-private partnerships, the role of NGOs and community organizations.
- Low cost technologies in water and sanitation, that are easy and cost-effective to maintain shall be developed and used.

**Objectives:**

- Develop criteria for installation of new drinking water supply schemes and ensure that all new schemes are safely managed, rationalized and constructed through need based criteria so that all areas and communities are served.
- Develop standardized service delivery models for both urban and rural drinking water supply schemes to improve efficiency, cost-effectiveness, improve monitoring and sustainability.
- Develop mechanisms for reuse, recycle and recharge of wastewater for other municipal and productive uses.
- Ensure that all drinking water supply systems are designed and constructed in line with the national drinking water quality standards and all municipal discharges comply with National Environment Quality Standards (NEQS).
- Install water treatment plants at existing drinking water supply schemes where required and incorporate water treatment facilities in all new drinking water supply schemes.
- Ensure development of water safety plans for all drinking water supply systems.
- Institute adaptation measures and disaster risk reduction and mitigation strategies to minimize the impact of climatic events on drinking water supply systems.

### *8.1.7* Strategic Development Plan

A variety of policy instruments and strategies will be used to achieve the objectives of the strategic development plan,

**i. Long Term Plan**

- Municipality will adopt a demand led approach in providing access to safe water and sanitation to ensure that scarce resources are properly utilized and ownership and sustainability of schemes is ensured over the long-term.
- Frame a broad policy framework at the provincial level which encourages and supports city district to design and implement policy which is in-keeping with the existing capacities and strengths of institutions.
- Feasibility Study for identification of new water sources with filtration plants for town

**ii. Short Term Plan**

- Priority for water supply and sanitation will be accorded to un-served, under-served areas, and disadvantaged areas.

- The design and layout of water supply pipes, storage tanks etc. should ensure that there is no contamination by overflowing sewerage systems, for example by maintaining a minimum distance between the two systems.
- Wherever possible, preference should be given to rehabilitate existing schemes (functioning or not) over the construction of new schemes, unless there are special reasons to justify otherwise.
- Exploration and regulation of fresh groundwater

### *8.1.8* Priority projects

#### i. Improvement of Water Intake Works

➢ **Project Justification**

The purpose of the proposed project is a safe water solution for the water intake from present source for Tando Mohammad Khan. The intake point is Phuleli Canal and other sources of water supply. The wastewater is discharged into the canal through the pumping station which has been constructed by HDA/WASA without considering that canal water is being used for drinking purposes by the local people downstream of this canal.

The objective of the project is to get uninterrupted water supply after treatment to supply potable water to the inhabitants of Tando Muhammad Khan town. The project is to improve the collection of raw water and rehabilitate the infrastructure. This project includes to increase the number of pumping stations and up gradation the sizes of pipe lines for equitable distribution of water.

Currently untreated water is supplied from Nasirabad / Phuleli Canal and the second connection is from Pandhi Wah. As phuleli and pandi wah both are surface water source. There are 6 pumping stations to supply water in Tando Muhammad Khan which are located at, 01 Phuleli canal, 02 w/w burhani shah, 01 Naseerabad Colony, 01 Akram wah, and 01 is at new sabzi mandi. Hence to improve its quality there is a need of instant water filtration /chlorination before supply. Improvements in water intake works cover below components;

- Construction of intake structure adjacent to Canal which will comprise of screens, pipe, valve chamber
- Repair, Rehabilitation and Necessary Construction Work of Wet well and pump room
- Installation of Pumps based on solar power
- Repair, Rehabilitation and Necessary Construction of Reservoir
- Laying of approx. 2 km pipeline from Intake structure to Reservoir including air, butterfly and washout valves

- Chlorination (Chlorination is effective against many pathogenic bacteria, normal dosage of Chlorination kills bacteria from water. Chlorination is an excellent way to disinfect drinking water supplies.

➢ **Project Benefits**

People of Tando Mohammad Khan are facing shortage of water supply which will be regulated. After implementation of this project the shortage areas will be improved and supply can be distributed on regular basis by arranging supply timings on daily basis.

➢ **Implementing Authority:** Tando Mohammad Khan MC, Government of Sindh and PHE Department.

➢ **Estimated Cost: 100.00 Million PKR Approx.**

**ii. Provision of New water supply network for 29% of Tando Mohammad Khan MC (Approx. 351.61 Acres)**

➢ **Project Justification**

According to data provided by PHED Tando Mohammad Khan about 29% of population of TM Khan has no water supply network & dependent on hand pump & community wells. People purchase their potable water through tankers due to unavailability of water supply network. This project will help to extend the supply of water in those areas where the network is not available. Provision of New Water Supply Network will cover main components i.e. Excavation, Pipe cost, Gate valve/ Washout valve/ Air release valve, Joints repairs, Balancing slopes at all network, Checking of pipe life with rupture checker and Valves for area wise pressure maintenance.

| **Population** | **101,863** |
|---|---|
| Total Urban Boundary Area | 3992.8 Acres |
| Total Urban Area (Excluding 2529.1 Acres which includes Agriculture, Vacant and Water Bodies Area) | 1,463.7 Acres |
| Urban Area excluding Core Town Area 251.23 Acres | 1,212.47 Acres |
| 29% unserved Area | 351.61 Acres |
| Installation of New water supply scheme is proposed to cater 29% population / Area of Tando Mohammad Khan town @ Rate of 3.0 Million Per Acre (1054.85 Millions) | 351.61 Acres (1054.85 Millions) |

➢ **Project Benefits**

After implementing of this project, the Potable water will be supplied to the whole of TM Khan Town.

➢ **Implementing Authority :** Government of Sindh- PHE Department Tando Mohammad Khan

➢ **Estimated Cost:** 1,054.85 Million PKR Approx. (Short Term).

**iii. Repair & Rehabilitation of Water Supply Network 71% Tando Mohammad Khan MC (Approx. 860.85 Acres)**

- **Project Identification & Justification**

Almost All the network of Water Supply in Tando Mohammad Khan is in poor condition and most of it requires repair & rehabilitation. According to data provided by PHED Tando Mohammad Khan, The current water supply is only 2.181 mgd as informed by PHED against the demand of 3.06 mgd. 71% of total population has piped water connection. People purchase their potable water through tankers due to the unavailability of water supply network. This project will help to supply of water in those areas where the network is available and existing network is damaged. The objective of the project is to get uninterrupted water supply for treatment to supply potable water to the inhabitants of Tando Muhammad Khan town. The project is to improve the collection of raw water supply collection. This project includes to increase the number of pumping stations and up gradation the sizes of pipe lines.

| | |
|---|---|
| Population | 101,863 |
| Total Urban Boundary Area | 3992.8 Acres |
| Total Urban Area (Excluding 2529.1 Acres which includes Agriculture, Vacant and Water Bodies Area) | 1,463.7 Acres |
| Urban Area excluding Core Town Area 251.23 Acres | 1,212.47 Acres |
| 71% served Area | 860.85 Acres |
| Proposal for Repair & Rehabilitation of Existing Water supply scheme shall help to supply safe potable water to served 71% population of Tando Mohammad town. One Million per Acre = 860.85 Millions | 860.85 Acres |

- **Project Benefits**

As already discussed above that existing supply network is old and needs repair and rehabilitation. So after implementing of this project, the Potable water will be supplied by piped water and connection facility will be made available to every household.

- **Implementing Authority -** Government of Sindh- PHE Department Tando Mohammad Khan
- **Estimated Cost: 860.85 Million PKR Approx. (Short Term)**

**iv. Installation of Water treatment Plant**

- **Project Justification**

  - **Surface Water Quality**

The attached sample was collected from Burhan Shah Pumping station (Surface Water). The surface water was found contaminated as per details are given in analytical report show non-compliance of WHO and SEPA standards against parameters i.e. Cadmium, Lead Mercury, Residual Chlorine, Barum & Coliforms,

- **Ground Water Quality**

  The second sample was taken from the stand post–groundwater. The groundwater testing at Burhan Shah failed in following–Marginal, Cadmium, Lead, Parameters, Mercury, and Barium. The microbiological analysis confirms presence of total colofirm, Fecal coliform and Ecoli. Test reports of Burhan Shah ground water, The Micro biological analysis confirms presence of total coliform and E-coli.

- **Project Identification**

  As the city is getting 2.58 mgd water supply, which is very contaminated and not fit for human consumption. So there is need for treatment of water. It will improve the living standard of the Tando Mohammad Khan town, and also benefit the wellbeing of community.

- **Project benefit.**

  After implementing of this project, every person will get healthy drinking water at their home step.

- **Implementing Authority - Government of Sindh- PHE Department TMK**

- **Estimate Cost: Rs.550.00 million approx.**

| PROPOSED PRIORITY PROJECTS | | | | | | |
|---|---|---|---|---|---|---|
| S. No. | Project Name | Estimated Cost In Millions | ADP | Non ADP | Status | |
| | | | | | Short Term | Long Term |
| **Water Supply** | | | | | | |
| 1 | Improvement In Water Intake Work | 100.00 | - | Non ADP | Short Term | - |
| 2 | Provision of New water supply network for remaining 29% (351.61 Acres) except core urban area. | 1054.85 | - | Non ADP | (Phase Wise) | - |
| 3 | Repair & Rehabilitation of existing Water Supply Network 71% (860.85 acres) except core urban area. | 860.85 | - | Non ADP | (Phase Wise) | - |
| 4 | Installation of Water treatment Plant | 550.00 | | Non ADP | | |

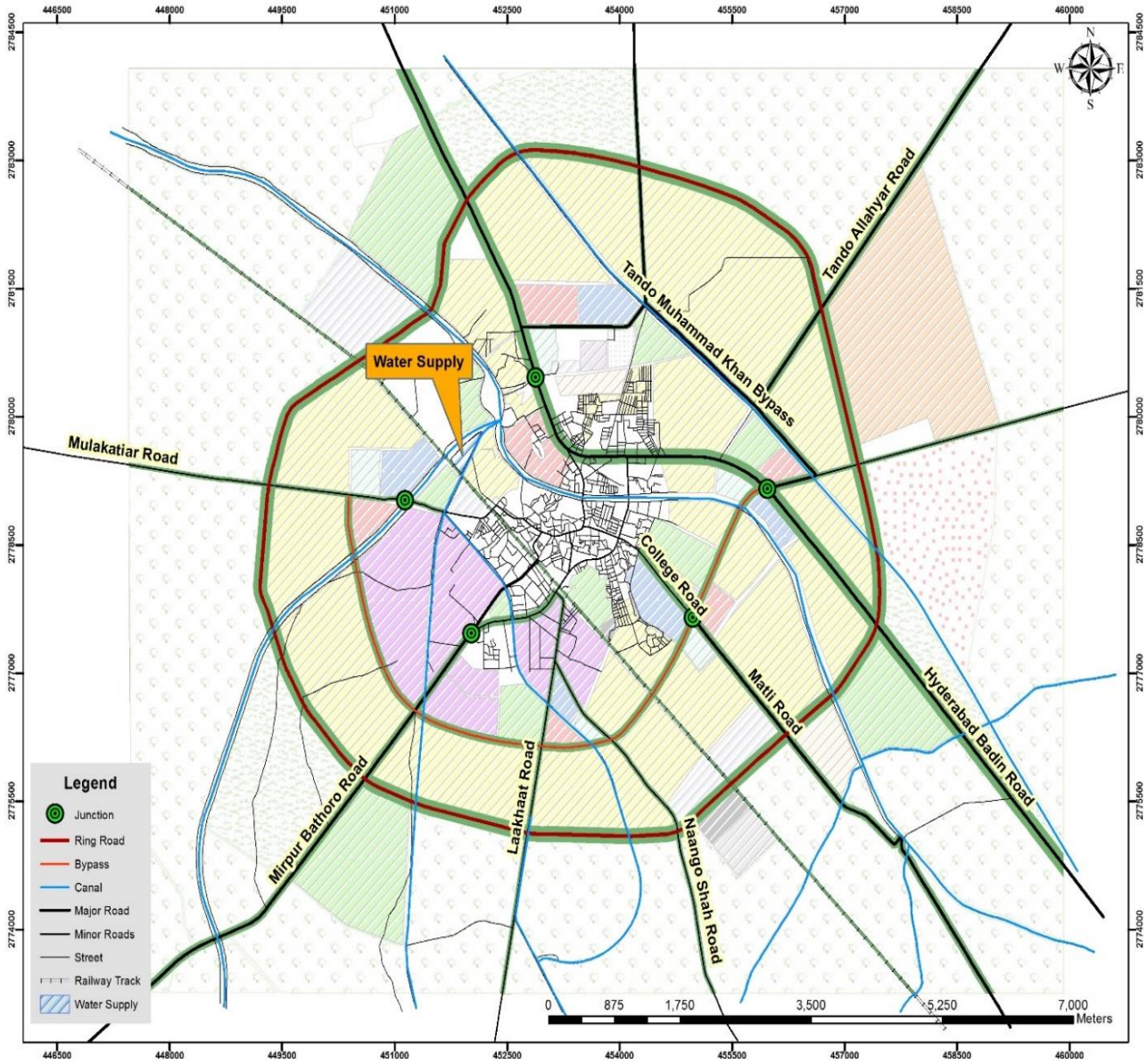



**Figure 8-4: Proposed Landuse for Utilities Related Services (Water Supply) for Tando Mohammad khan**

### *8.1.9* Immediate Action Plan for Core Urban Area

Existing water supply scheme of core town area has passed ages and became outdated, core area of Tando Muhammad Khan is counted as densely populated area of DHQ town, residents of core town area are complaining regarding the quality of water supplied to residents. Mixing of drainage with fresh Water is major issue observed during survey. So therefore it is proposed to repair & rehabilitate existing water supply network of core town area. Repair and rehabilitation of existing infrastructure for core urban is proposed on immediate basis. Tentative costing for repair and rehabilitation is given below;

| Rehabilitation of Existing Water Supply Network of Core Urban Area Tando Mohammad khan | | | | |
|---|---|---|---|---|
| **S. No.** | **Name** | **Area (acre)** | **Per acre cost (PKR) million** | **Cost (PKR)** |
| **Total Core Urban Area : 251.23 Acre** | | | | |
| 1 | **Water Supply System:** (Water supply system renovation includes supply pipe networks, pumping machinery and equipment's for more efficient and effective supply of water). | **251.23** | **1.72 million Per acre** | **432.00** |
| | | | **Total Cost (PKR). Million** | **432.00** |

**Note:**

- Water supply system renovation includes supply pipe networks, pumping machinery and equipment's for more efficient and effective supply of water.

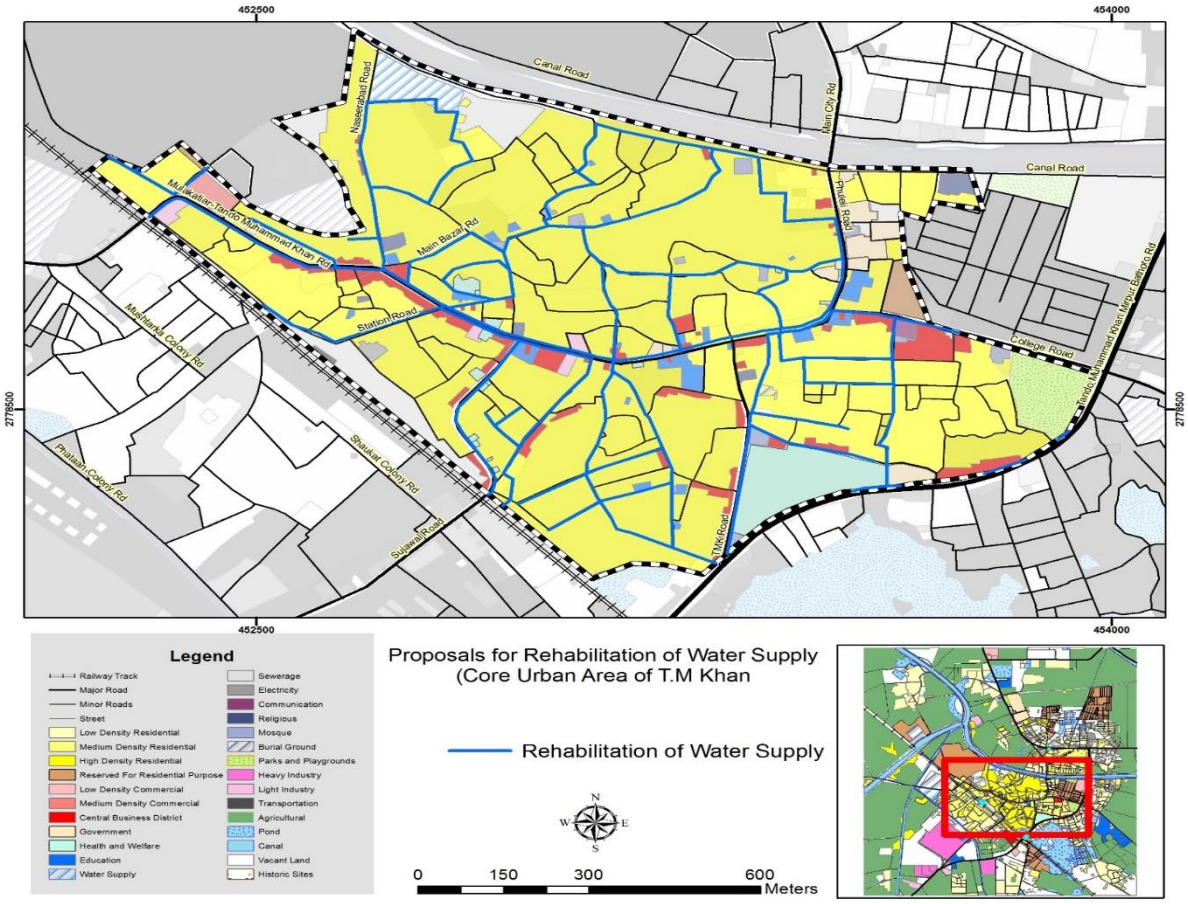



**Figure 8-5: Repair & Rehabilitation of Water Supply Network for Core Town Area TMK**

## 8.2 Sewerage and Drainage

### *8.2.1* Existing Situation

The existing system of TMK comprises Domestic or Sanitary Wastewater which refers to liquid discharge from residences, business buildings, and institutions. Industrial waste is discharged from manufacturing plants.

Municipal wastewater is the general term applied to liquid collected in sanitary sewers / drains discharge reaching sewage disposal station/sump well from where it should go to stabilization pond but at present raw sewage without treatment is either discharged to Phuleli Canal or to ditches. There are no any stabilization ponds have been constructed.

**Existing Sewerage and Drainage System as reported by PHED (Public Health Engineering Department).**

- Waste generation in Municipal Committee is 3.278 mgd.
- FC Pipes used for laying 6” to 18” sewers.
- Disposal pumping stations = 5 Nos. (figure 6-14 )
- Existing Drains Type I = 25750 ft.
- Existing SWD Type II & III = 25840 ft. (includes piped sewers)
- Rainfall is occasional due to which no separate drains exists for storm water.
- Improvement and Extension schemes completed = Rs.0202.780 million.

**Figure 8-6: Raw Sewage Discharge from Pumping Station**

**Figure 8-7: Bad Condition of Structure at Sewage Lift Station**

According to the socio-economic survey conducted by the consultants, Coverage by a sewerage/drainage network ranges from 37% of the separate type of 63% of combined surface wastewater disposal systems in Tando Muhammad Khan. The majority of socioeconomic survey respondents were dissatisfied with the current sewerage systems.

- **Waste Water Treatment Plant**

Sewage is mainly disposed of in roadside drains, and untreated sewage collects in ponds/swamps. Wastewater is not treated since treatment plants are non-existent due to the shortage of technical staff and funding.

PHED has recently revised its Phase-II Scheme to include wastewater treatment plant and new areas development of Water Treatment Plant & New Areas Development, as per PHED

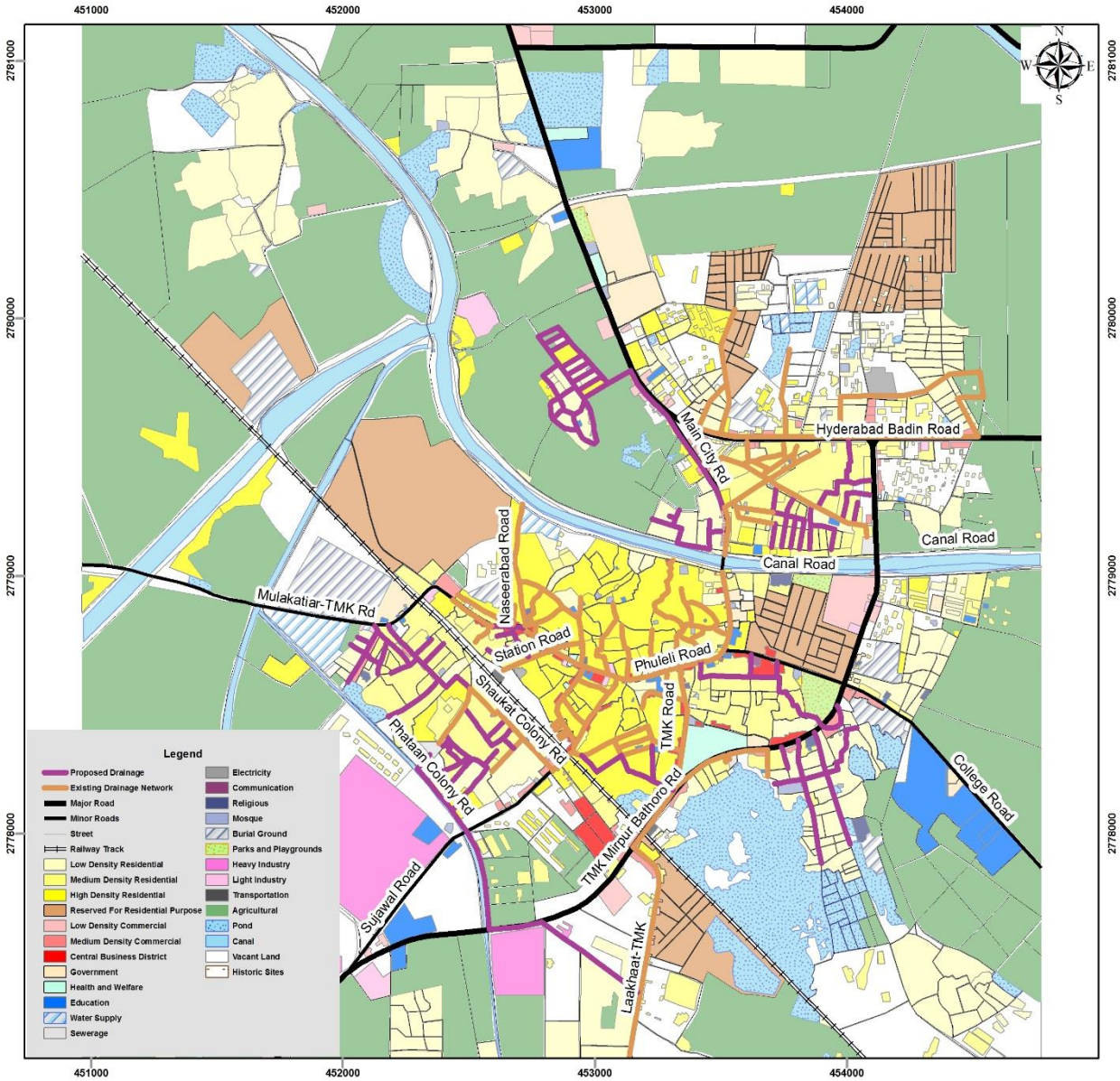



**Figure 8-8: Location of Disposal Stations**

### *8.2.2* Issues:

- Damaged lines and was not fully functional
- Overflowing sewage water on the streets and blockade in the sewerage lines
- Improper operation and maintenance of sewerage facilities.
- Inefficient record of operation and maintenance works including machinery and equipment available for cleaning drains / sewers – in the same manner, little information in written form is available on the performance of pumping and treatment facilities such as flow rates, operation hours, water qualities, facility failures and repairs and so forth.
- The many informal settlements are located in poorly drained low lying land can be subject to flooding, resulting in ponds of stagnant water in their midst and providing breading grounds for mosquitoes and water borne diseases. There is no standby pumping equipment at disposal stations.
- The drainage system and structures are in poor condition with open smelly drains and sewers.
- There is no sewage treatment and untreated sewage collects in ponds / swamps or directly discharge in to irrigation canal. The residents were dissatisfied with current sewerage system.
- No waste water treatment plant, thus raw sewage is being discharged into water bodies.
- The sewerage system lacks proper operation and maintenance due to shortage of technical staff and proper equipment and vehicles.

### *8.2.3* SWOT Analysis

| Strength | Weakness | Opportunity | Threats |
|---|---|---|---|
| **SEWAGE COLLECTION & DISPOSAL** | | | |
| 1. The existing sewerage system facilitates the urban area of the city.<br>2. Combine system (open channel and sewer) serving most of the town area.<br>3. Sufficient land for disposal sites is available. | 1. Poor maintenance condition; garbage enters into sewers, which requires de-silting.<br>2. Drain water is disposed of untreated into canals and drains.<br>3. Open sewers<br>4. Outdated and disconnected network.<br>5. No treatment before disposal<br>6. Mixing of solid waste disposal into Sewerage.<br>7. Rain/Flood water still standing in town center areas. | 1. An appropriate sewerage system plan should be implemented.<br>2. Development of well-designed trunk sewerage network with less number of disposal station.<br>3. Job opportunities for skilled staff for proper maintenance<br>4. Revenue can be generated through by charging services for cleaning.<br>5. PPP in service delivery<br>6. Reclamation of land (that accommodates water of flood/rain) for public land uses. | 1. Public health<br>2. Storm water flooding/ over flow of sewers<br>3. Environmental degradation<br>4. Funding & policies.<br>5. Land grabbers |

| Strength | Weakness | Opportunity | Threats |
|---|---|---|---|
| **DRAINAGE & FLOOD CONTROL** | | | |
| 1. Most of the town is served by combined drain and sewer system. | 1. Open drain on street.<br>2. Improper channelization of drains<br>3. Over flow of storm water drains<br>4. Lack of interest among stakeholders involvement in disaster relief activities.<br>5. Poor administrative control for operating existing drainage system of the town.<br>6. Depression areas causing permanent ponding. | 1. The city's old drainage system needs revival through cleaning.<br>2. Flood protection embankments should be enhanced up to greater extent to provide maximum protection to surrounding villages<br>3. Development of surface drainage network with easy disposal to river/canals<br>4. Completely removal or treatment of land where temporary ponds have been formed in main town area. | 1. Canal's water have been contaminated by open drains discharge.<br>2. Medium level flood disaster threat to local communities living near to main course of River Indus.<br>3. Open and overflowing drains have impact upon human health and give birth to epidemic diseases. |

### *8.2.4* Need Assessment

Actual waste water generation as per secondary data provided by PHED in Tando Muhammad Khan MC is 3.278 mgd, Current and estimated wastewater generation for the period to 2037 is shown in bellow table:

**Table 8-2: Sewage Generation Projections**

| | | | | | | |
|---|---|---|---|---|---|---|
| Tando Muhammad Khan | Daily demand of water @ 30gpcd | 3.06 mgd | 3.43 mgd | 3.86 mgd | 4.34 mgd | 4.87 mgd |
| | Sewage Generation @70% of WS | 2.14 mgd | 2.40mgd | 2.70 mgd | 3.04 mgd | 3.41 mgd |

### *8.2.5* Sindh Sanitation Policy 201736

Targets:

Its key targets are:

- Eradicate Open Defecation from Sindh Province by 2025, while 70% villages of 13 high priority districts achieve the status of open defecation free by 2020.

[36] Sindh Water and Sanitation policy 2017

- 100% households in Sindh have access to and use sanitary latrines by 2025, while 70% of rural households in high priority districts will achieve this by 2020.
- Strengthen and implement liquid waste management with sewer lanes and Covered/improved drains with 85% coverage of urban areas and 60% coverage in rural areas.
- Create and develop wastewater treatment mechanisms to cover 75% of urban areas and 40% in rural areas by 2025.
- More than 90% of rural households and 100% of urban households wash hands with soap at critical times by 2025.

Principles:

- The Policy aligns itself with the goals and targets of the SDGs for sanitation, which require sanitation services to be safely managed, have a private improved facility where faecal wastes are safely disposed on site or transported and treated off-site; plus a hand washing facility with soap and water.
- Safely managed sanitation services is a fundamental right for all persons in Sindh province, and should be ensured through enhanced access to marginalized and low resource areas with equitable distribution of resources. Recognition of inequities and rights based programming will be given key emphasis during the planning, execution and monitoring of sanitation programmes.
- The policy seeks to prioritize the areas that pose the greatest risk to human health namely hygiene awareness and excreta disposal, and then address the environmental health risks that are posed by poor drainage and solid waste disposal.
- Increase access to high quality nutrition-sensitive services, including access to water, sanitation facilities, and hygiene.
- The policy shall promote the community led approaches to strengthen the demand for safely managed improved sanitary conditions that emerges from local communities. The multi-stakeholder partnerships and collaborations comprising of citizens, governments, civil society, non-governmental organizations (NGOs), donors, academia, media, etc. be encouraged to maximize the synergies in designing and implementation of interventions.
- Affordable (in terms of designs as well as availability of water) and cost effective technical solutions with necessary modifications and adaptations in technical standards to be consistent with cultural sensitivities of specific communities will be identified and marketed.
- The component sharing model as envisaged in the National Sanitation Policy will be Institutionalized gradually in which the community is responsible to construct lane and neighborhood level sewers (internal development) on self-help basis and the government focuses on trunks, disposal and treatment unit (external development).
- The role of women shall be an integral component of behavioral change communication strategies and project planning, implementing and monitoring through capacity development and social mobilization of relevant stakeholders.
- Raw sewerage use for agriculture must be stopped.

### *8.2.6* Strategic Development Plan

The aim of Strategic Development plan is Provision of adequate Sewerage and Drainage facilities to the DHQ Town through equitable, efficient and sustainable sanitation services. Lanes may continue using concrete drains and to discharge into sewers through screening chamber. Some of the objectives include:

**i. Long Term Plan:**

- Improving standards of public health through provision of improved services supported up by legal, regulatory and binding framework.
- Wherever existing sewerage systems discharge untreated sewerage in storm water drains or irrigation canals it should be treated before discharging, and may be used for agricultural purposes or converted into lakes and ponds as part of recreational areas.
- Construction / Rehabilitation of Waste Water Treatment Plant

**ii. Short Term Plan:**

- Priority for sanitation will be accorded to un-served, under-served areas, and disadvantaged areas.
- An overall sanitation plan will be developed for all urban settlements by city District governments and the MC in coordination with all other agencies involved in sanitation.
- Special focus on need based interventions in sanitation sector.
- Gravity flow systems will be used for sewerage schemes so as to avoid pumping and O&M costs.
- Acquire Land & Provide Stabilization ponds for full treatment to produce acceptable quality of effluent for re use.

### *8.2.7* Priority Projects

**i. Repair & rehabilitation of primary and secondary drains 94% (1375.87 Acres) @ of one million per acre) except core urban area**

- **Project Justification**
  Almost all the drains in Tando Mohammad Khan MC are in poor condition and most of it are open drains. More than 59% of areas of Tando Mohammad Khan MC have drainage system. Only 41% have manual cleaning system. The drains are needed to rehabilitate and where the drains are not available there should be provided. Therefore it is proposed to repair & rehabilitate existing drainage scheme for DHQ town on priority basis covering an area of 6,562 acres excluding core town area. Repair & Rehabilitation of Primary and Secondary Drains will include the following components;
  - Repair of Walls, bed and Top slab of drains, manholes and chambers
  - Reconstruction of drains ,chambers and manholes where found completely damage

- Cleaning of pipes, chambers, drains and inlet gratings
- Laying of news pipes after replacement of old damage pipes

➢ **Project Benefits**

As Tando Mohammad Khan have not proper sewage and drainage system so after implementing of this project, the sewage water of Tando Mohammad Khan town will easily dispose and help to drain the rain water.

➢ **Implementing Authority**

Government of Sindh- PHE Department Tando Mohammad Khan

➢ **<u>Estimated Cost</u>: 2663.93 Million PKR Approx.**

**ii. Installation / Construction of new drainage network for remaining 6% (87.82 Acres)**

➢ **Project Justification**

About 6% of the houses have septic tanks in their houses for storage of sewage. This project will help to proper disposal of sewage water of TM Khan Town.

➢ **Project Size**

The tentative land use of DHQ town is about 1463.70 acres approximately (This tentative area is excluding core urban area, agriculture and vacant land & water bodies). According to socio economic survey results 6% (87.82 Acres) of town area is not connected with main drainage network and count as unserved area. Therefore it is proposed to install new drainage and sewerage network for DHQ town on priority basis covering an area of 87.82 acres excluding core town area. Construction of new drainage network will cover the following components;

| **Project Size** | |
|---|---|
| Land use of DHQ town excluding Core urban Area, Agriculture, Vacant Land & Water Bodies in Acres | 1463.70 Acres |
| 6% land use of DHQ town excluding Core urban Area, Agriculture, Vacant Land & Water Bodies in Acres | 87.82 Acres |

- Construction of Walls, bed and Top slab of drains, manholes and chambers
- Construction of drains ,chambers and manholes where found completely damage
- Cleaning of pipes, chambers, drains and inlet gratings
- Laying of news pipes and connection with existing infrastructure

➢ **Project Benefits**

After the implementation of this project, the inhabitants can easily drain the sewerage water in the drains (Municipal system) provided by the Municipal committee.

- **Implementing Authority - Government of Sindh- Tando Muhammad Khan PHE Department**

- **Estimated Cost: 263.46 Million PKR Approx. (Short Term)**

**iii. Construction of Sewage Treatment Plant (STP)**

- **Project Scope**

Currently, waste water treatment in Tando Muhammad Khan Town is directly disposedoff by five pumping stations located near phuleli and ditches. Due to unavailabilty of sewage treatment plant, the preference is given to conventional / Natural treatment of waste water through oxidation ponds. Therefore it is proposed to construct Sewage Treatment Plant for DHQ town on priority basis & convert existing oxidation Ponds area into STP. Initially, construction of STP having capacity of **2.5 Million Gallon** is proposed on priority basis on land of four acres of existing lagoon located near Railway station (Lakhaat road). STP involves the process of pre and secondary treatment of waste water. The following components includes the process;

i. Raw water screening
ii. Grid removal
iii. Oil and gas removal
iv. Aeration Tank
v. Sludge Separation & Treatment
vi. Disposal of Sludge

- **Project Benefit**

After the implementation of the plan wastewater will be used for landscaping or maybe for other use.

- **Implementing Authority - Government of Sindh, PHED TM Khan**
- **Estimate Cost: Rs.350 million approx.**

| S. No | Project Name | Estimated Cost In Millions | ADP | Non ADP | Status | |
|---|---|---|---|---|---|---|
| | | | | | Short Term | Long Term |
| **Sewage & Drainage** | | | | | | |
| **1** | Repair & rehabilitation of primary and secondary drains 94% (1,375.87 Acres-one million per acre) except core urban area | 1375.87 | - | Non ADP | **Short Term** | - |
| **2** | Construction of new drainage network for remaining 6% (87.82 Acres) three million per acre) except core urban area | 263.45 | - | Non ADP | **Short Term** | - |
| **3** | Construction of Sewage Treatment Plant | 350.00 | - | Non ADP | **Short Term** | - |

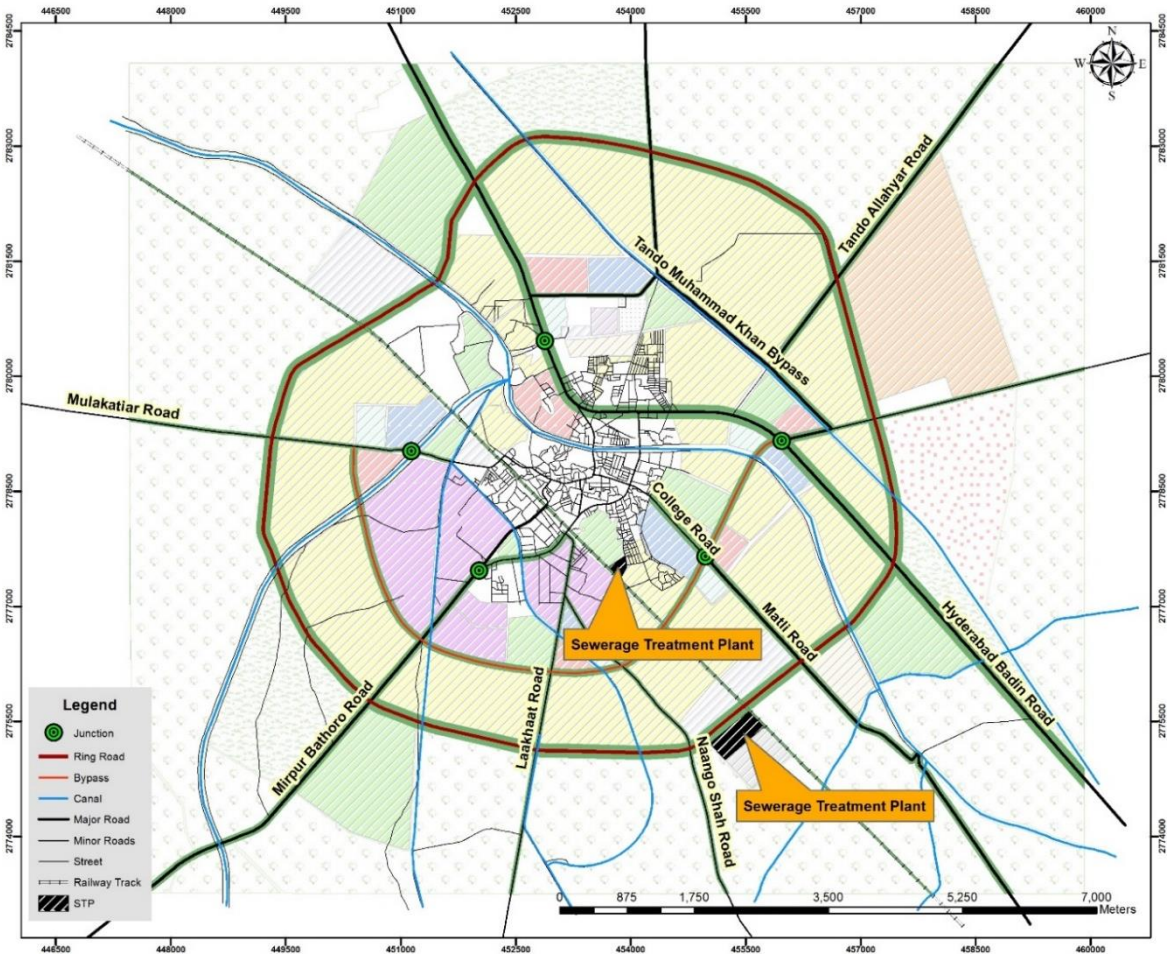



**Figure 8-9: Proposed Landuse for Utilities (Sewerage & Drainage) Related Services TMK**

### *8.2.8* Immediate Action Plan for Core Urban Area

During the survey the residents complained that, the design of existing drainage network is not fulfilling the present demand. And old sewerage line which had burst several times within one year. So therefore it is proposed to repair & rehabilitate existing sewerage & Drainage network of core town area.

| S.No | Name | Area in Acre | per acre cost (PKR) million | Cost (PKR) |
|---|---|---|---|---|
| **Total Core Urban Area : 251.23 acre** | | | | |
| 1 | Sewerage System | **251.23** | **3.51 million/ acre** | **881.46** |
| 2 | Storm Water Drain System | | | |
| | | | **Total Cost (PKR). Million** | **881.46** |

**Note:**
* Rehab of Sewerage system includes all urban core area network system with all related machinery and equipment.
* Rehab of Storm water drain system includes all the core town area storm drain system through all steeps slopes and peak areas with all linking equipment and machinery.

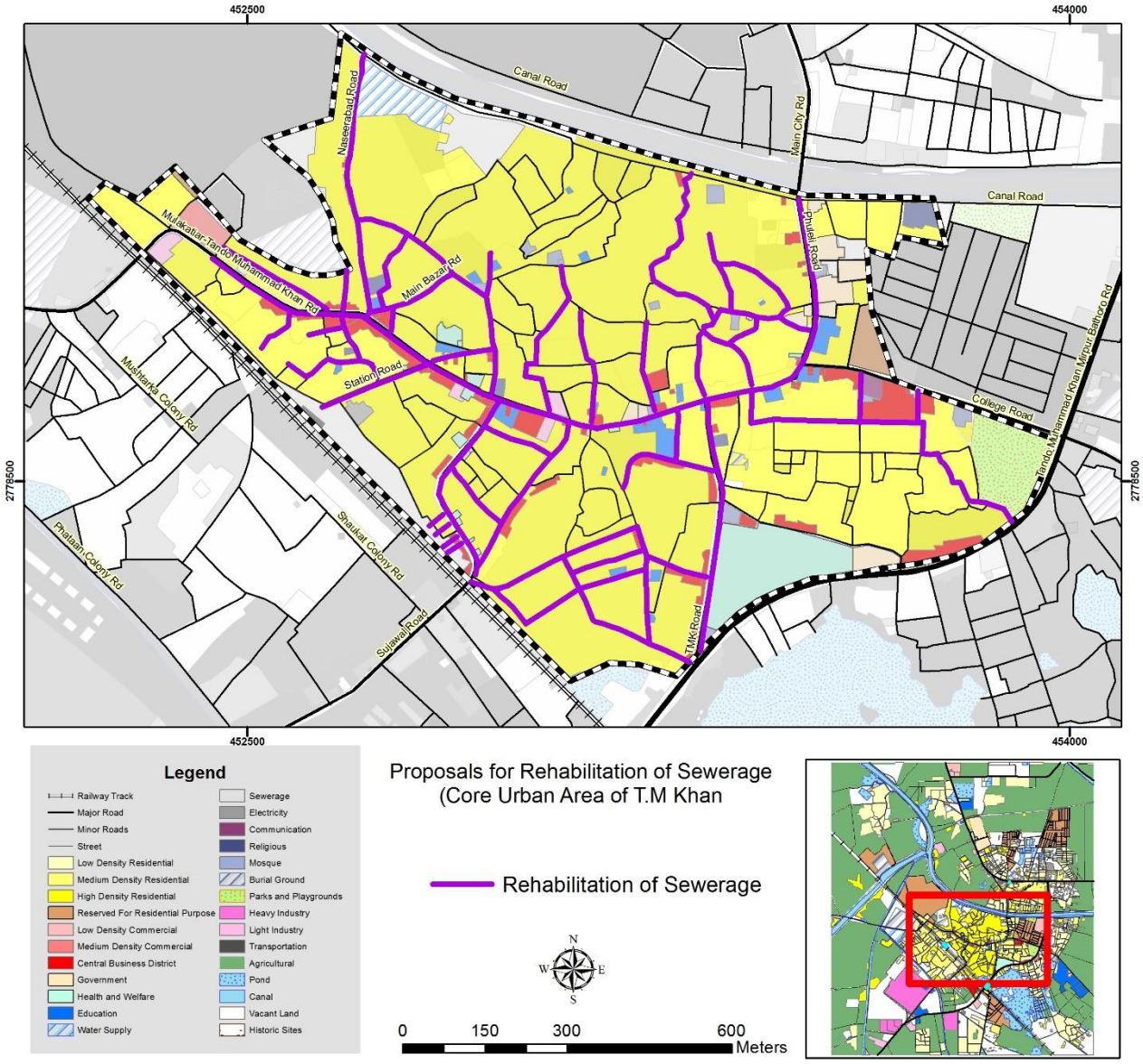



**Figure 8-10: Repair & Rehabilitation of Sewerage and Drainage Network for Core Town Area TMK**

## 8.3 Solid Waste Management

### *8.3.1* Existing Situation

After the passing of Sindh Solid Waste Management Board Act in 2014, Sindh Solid Waste Management Board (SSWMB) has been established which has the responsibility to collect and dispose all kinds of solid waste being generated in Sindh. As indicated, TC/MC is officially responsible for the entire solid waste management of the district under the directives of SSWMB. At present SSWMB has directed the municipal committees for identification of land for Garbage Transfer Stations and Landfills so that garbage collection and transfer & transport operations can be handed over to SSWMB for effective management of solid waste.

Meanwhile feasibility studies of medical hazardous waste of Hyderabad, Mirpurkhas and Shaheed Benazir Abad are in progress. Once the municipal committees would be able to allocate proper and adequate land for waste disposal on long term basis then SSWMB will come into action for effective SWM at primary and secondary level in these District Headquarter Towns. The office location and the premises of the Tando Muhammad Khan town provide a functional office cum workshop station for its waste management fleet. MSW collection vehicles, tractors, trolleys and other equipment are stationed and operates from the administrative office hence remains the focal point of the management and operational activity.

The collection mechanism that exists in Tando Muhammad Khan is primary collection system. Tractor trolleys which are presently available inadequate in numbers for loading and transferring of MSW from various collection points with the help of sanitary / waste collection staff. Total actual numbers of Sweepers /and Cleaning staff is 216 sweepers / sanitary staff with total sanctioned capacity of 250 in the municipality.

There are number of established active primary collection points. These are not permanent structures but rather empty corners or vacant places. Besides, every locality has got throw away sites in the form of depressions, empty areas, cuttings areas etc. These types of non-designated points if come in the collection route are often served by the municipality staff or usually avoided due to shortage of time and resources constraints.

However, there are four (04) identified designated garbage collection in the municipal community area of Tando Muhammad Khan. Garbage collection points are namely;

1. Back side of Municipal Office
2. Near Masjid Ali
3. Back side of Mir Ghulam Ali Park
4. Civil Hospital collection point

These points are scattered in the streets and roads are of critical significances. From these locations, waste is collected by sanitary workers and is transferred and transported to the disposal / dumping point outside the city limits. The existing or active dumping site being operated for Tando Muhammad Khan by municipal committee is also highlighted in the figure and is identified as Nonarian dumping site. Solid Waste collection is done from the designated point and taken up out of city by means of vehicles such as; tractor

trolleys, Mazda Lorrie and Ching-chis. Refuse vehicle may not be used on daily basis rather it generates trips on need basis.

### *8.3.2* Hazardous Waste:

The waste generated in healthcare facilities (HCF) such as hospitals and laboratories are mingled with the MSW. The estimated quantities of hazardous waste (risk waste) can be estimated from the bedded healthcare facilities.

**Table 8-3: Hazardous waste (Healthcare waste) source and estimation in T.M. Khan**

| S. No. | Healthcare Facilities (HCF) * Tando M Khan | No. of Beds* | HCW @ 1.1 kg/bed/day! |
|---|---|---|---|
| 1. | Taluka Hospital 01 No. | 36 | 39.6 |
| 2. | Rural Health Unit 03 No. | 34 | 37.4 |
| 3. | TB Clinic 03 No. | 09 | 9.9 |
| 4. | Basic Health Unit 15 No. | 32 | 35.2 |
| | **Total (22)** | **111** | **112.1 per day** |

*Source: Development Statistics of Sindh, 2014, Bureau of Statistics, Govt. of Sindh, Recent study on HWM, SSWMB unpublished ICEPAK*

Hence the healthcare waste is insignificant in comparison the MSW generated.

Tando Muhammad Khan is primarily an agro-based district and the industrial base in this district is dependent on the agriculture. This district has established industries which are related to the agriculture i.e. the raw material, for these industries, is provided by the agriculture sector. Besides, this district is the second largest Ajrak manufacturer in Pakistan. So, a huge small scale Ajrak manufacturing industry is well established in this district. Besides there are sugar mills, flour mills, and rice mills in this district. Since there is no record of other kinds of hazardous waste being generated due to industrial activity in the town of Tando Muhammad Khan it is assumed that any such waste generated would form part of the Municipal collection as well.

### *8.3.3* Issues:

- Shortage of machineries and equipment
- Lack of properly organized waste Collection System
- Arrangement of segregation, collection and disposal of infectious hospital waste
- Segregation of Organic waste from Municipal Solid Waste (MSW) and Treatment
- Safe disposal of hazardeous waste in an environmentally sustainable manner
- Directives for implementation of waste policy framework and execution of its management system.

### *8.3.4* SWOT Analysis:

| SOLID WASTE MANAGEMENT | | | |
|---|---|---|---|
| **Strength** | **Weakness** | **Opportunity** | **Threats** |
| 1. Availability of Town Committee<br>2. System in place with improving efficiency, there is a slightly improvement in garbage collection and allocation of landfill site to dispose of toxic waste<br>3. Recycling by scavengers | 1. Poor financial and operational management system.<br>2. There is no system to identify toxic wastes produced by various activities.<br>3. Communities' particularly low income groups are not aware of disposal procedures.<br>4. 70% households does not have provision of infrastructure for sanitation purpose. | 1. Appropriate measures should be adopted for collection and re-cycling of SWM.<br>2. SWM recycling will help to generate revenue.<br>3. More landfill sites should be identified for future disposals.<br>4. Establishing of a primary collection system would add more revenue resources.<br>5. Opportunity for recycling and reuse of solid waste, such as RDF, bio-gas etc.<br>6. PPP in service delivery | 1. Improper sanitation<br>2. Poor public health<br>3. Outdated drainage system<br>4. Threats to plants and animal life<br>5. Loss of trust building with people in future. |

### *8.3.5* Need Assessment

The waste generation rate estimated from the studies conducted earlier in SCIP-3 project suggests to be around 0.4 – 0.45 kg per capita per day[37]. However, it is recommended to undertake the field study for the determination of waste generation and characterization for TM Khan in order to plan and design the solid waste management system. Considering waste generation rate for design purpose as 0.45 kg per capita per day with the current (2017) population of the municipal committee of Tando Muhammad Khan as 101,863, the total municipal solid waste load arising in the municipality is approx. 48,550 kg or 48.6 tons per day. For 2017 the required landfill area is 10.2 acre. Projected landfill area till 2037 is 16.24 acres.

### *8.3.6* Policy Guidelines38

Implement integrated solid waste management with 100% coverage in urban areas and 60% in rural areas of Sindh by 2025.

[37] SCIP-03 Program Management, Project Preparation and Implementation Support for Planning & Development Department, Solid Waste Management Studies of Towns of Central Cluster of Province of Sindh, 2013, Brisbane City Enterprises Pty Ltd, & MMP
[38] Solid Waste Management Policy for Sindh
Sindh Water and Sanitation policy 2017

Principle

- Develop integrated solid waste management system.
- Conduct a study on wastewater and solid waste to develop town level profiles (including Infrastructure, equipment and staffing)
- Conduct waste characterization studies.
- Smooth and efficient Solid waste collection and disposal by providing door to door collection services.
- Ensure Effective solid waste management by developing a list of staffing, hardware and equipment for solid waste management.
- Efficient Solid waste disposal and recycling by establishing transfer stations to reduce disposal time.
- Recycle solid waste by systematic separation.
- Sanitary landfill options identify for towns where it is feasible.
- Formalize contracts with companies for waste to energy options. Atleast each mega/intermediate city has a WTE (Waste to energy options) in place.
- Provide each town with a centralized and functional high risk hospital waste disposal facility.
- Update status of all slaughterhouses (recognized and unrecognized) in each district and prioritize those for rehabilitation, solid waste and wastewater management.
- Provide refresher training on slaughterhouse safety and hygiene practice guidelines to 100% slaughterhouse staff in recognized slaughterhouses in safe handling and disposal of carcass, entrails, hides, and wastewater.
- Efficient and effective management of Industrial solid waste by determining the current status of industrial solid waste production and disposal and development of strategies and actions for efficient and effective management of industrial solid waste.
- To understand, accept and support the role that communities, NGOs and the formal and informal sector are playing in SWM.
- Develop and use technologies that are affordable, applicable and cost effective to maintain the solid waste management.
- Allocation of proper landfill sites outside of the urban area and Final disposal of waste at least 500m from housing to a contained area chosen and designed according to geological conditions, water table, wind etc.

### *8.3.7* Strategic Development Plan

The aim of this strategic development plan is to improve the quality of life of the people of DHQ Town and the physical environment and also provide guidelines for the management of solid waste in the town.

**i. Long Term**

- Community and Private Sector Involvement in SWM: The active involvement of local communities and the private sector is essential for an effective waste management system. It would be beneficial to start involving local communities and the private sector in waste management, which has been a slow process. This process needs to be accelerated in a well planned manner.

- Public Awareness and Education: It can be brought about in many different ways through the electronic and printed media and street talks, through community organizations such as schools, institutions, and households, using a public-address system, distributing leaflets, for public awareness.
- Implement Waste minimization: It is done through pilot and demonstration projects. These pilot and demonstration projects can be used to raise awareness of basic waste-minimization measures.

**ii. Short Term**

- The collection and disposing of solid waste is the responsibility of the MC. The mechanism for solid waste management is not available, so therefore a detailed feasibility is proposed to develop an efficient solid waste management in Tando Mohammad Khan town.
- The collection system needs to be made more effective and efficient.
- Municipal Committee has already initiated some work on biomedical-waste management. It should immediately start segregation practice for biomedical waste collection system.
- Encourage On-site Reuse and Recycling: This method will reduce material consumption and the quantity of hazardous waste generated. As a result, material cost and waste treatment cost will be reduced.
- Techno-economic feasibility and detail study of characterization of waste is proposed on basis of the policy guidelines.
- Develop integrated solid waste management system keeping in mind the method, procedure and design at front end, middle end and back end, based on best possible public health practices and environmental protection laws/rules.

### *8.3.8* Priority Project

#### i. Feasibility Study for Solid Waste Management Mechanism

➢ **Project Justification**

The collection and disposing of solid waste is the responsibility of the Tando Mohammad Khan MC. The mechanism for solid waste management is not available in Tando Mohammad Khan so therefore a detailed feasibility is proposed to develop an efficient solid waste management in Tando Mohammad Khan town.

**Central Composting Plant:** In order to handle a large quantity of waste it is essential that organic waste is segregated from the municipal solid waste (with possible recovery of recyclable items) for which a set up of large-scale central composting plant is required. This should be done with private sector participation.
Note: However, a Feasibility study is required for the designing and costing of the project.
**Landfill Site:** Landfill is an ultimate safe disposal option for Municipal Solid Waste and is imminently required. Land fill should be in the radius of 4-5 km of the town

- **Project Benefits**
  This project will help to find feasible solution to provide efficient mechanism of solid waste management and also help to improve the health conditions of the town which are causing un-hygienic due to un-availability of solid waste management in the town.

- **Implementing Authority -** Government of Sindh- PHE Department Tando Mohammad Khan

- **Estimated Cost: 80 Million PKR Approx.** However, a Feasibility study is required for the designing and costing of the project.

| S. No. | Project Name | Estimated Cost In Millions | ADP | Non ADP | Status | |
|---|---|---|---|---|---|---|
| | | | | | Short Term | Long Term |
| **Solid Waste** | | | | | | |
| 1. | Feasibility Study for Solid Waste Management Mechanism | 20.00 | - | Non ADP | **Short Term** | - |
| 2. | Procurement for land acquisation process for Landfill Site (08 acre). | 60.00 | - | | **Short Term** | - |

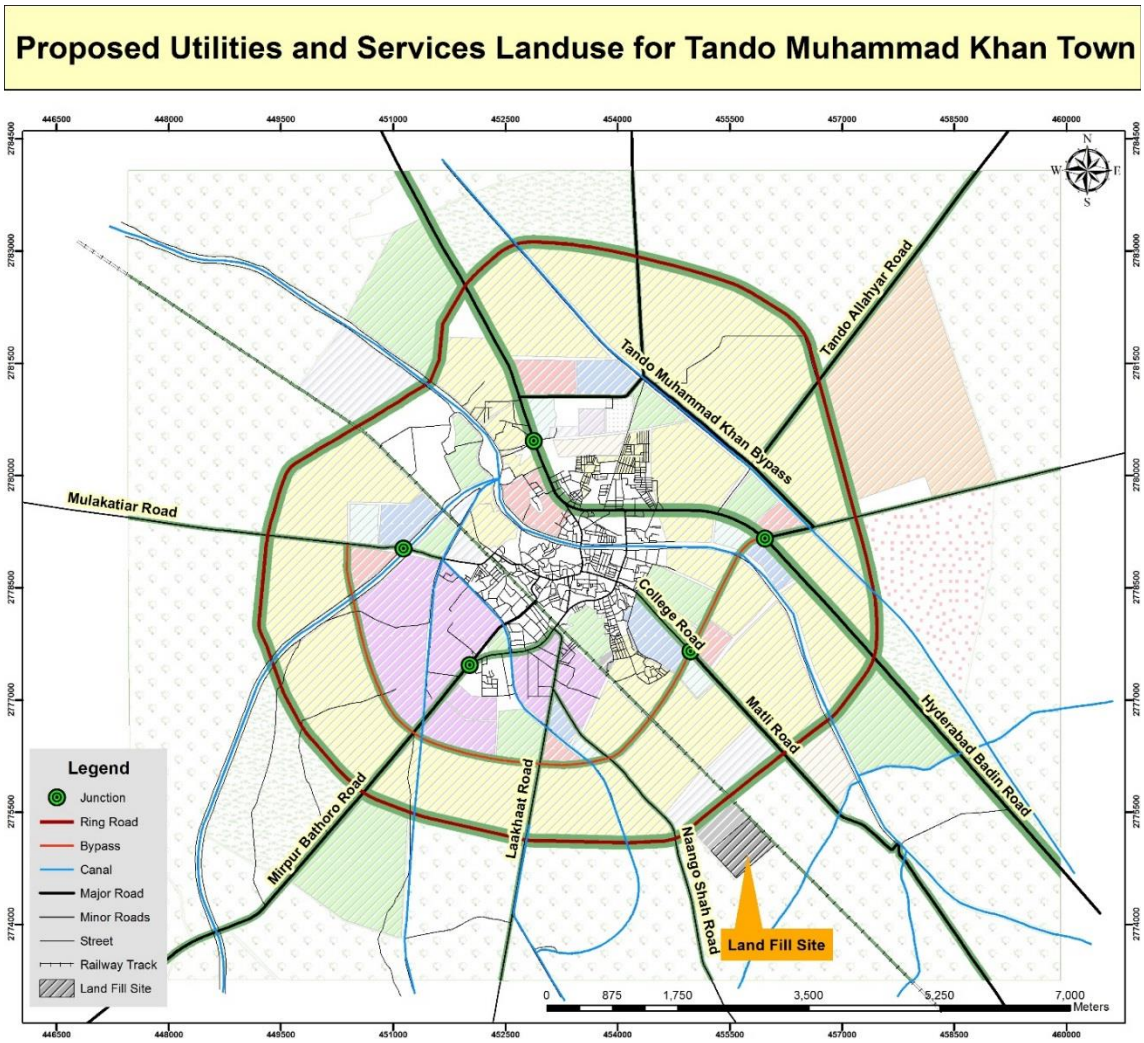



**Figure 8-11: Proposed Landuse for Utilities (Solid Waste) Related Services TMK**

### *8.3.9* Immediate Action Plan for Core Urban Area

Heaps of solid waste is evident in the core urban area. It is proposed that primary level collection i.e. door to door collection system should be launched immediately by Municipal Committee. Waste generated by the market of the core urban area should be picked on daily basis.

- **Suitable locations for Disposal Points for core urban area**

  There are number of recognized / established active primary collection points in the town. These are not permanent structures but rather empty or vacant corners. Besides regularly served designated collection points, every locality has got throw away sites in the form of depressions, empty areas, cuttings areas etc. These types of non-designated points if come in the collection route are often served by the municipality staff or usually avoided due to shortage of time and resources constraints.

| S. No | Name | Containers Nos. | Cost / Container | Cost (PKR) |
|---|---|---|---|---|
| **Total Core Urban Area : 251.23 acre** | | | | |
| 1 | i. Solid Waste Management System<br>ii. Installation of Collection Points | **80.00** | **520,000.00** | **41,600,000** |
| | | | **Total Cost (PKR). Million** | **41.60** |
| **Note:**<br>* Solid Waste Management System includes – handcarts and donkey pull-carts for primary collection; then open trucks, tractor/trolley systems etc. | | | | |

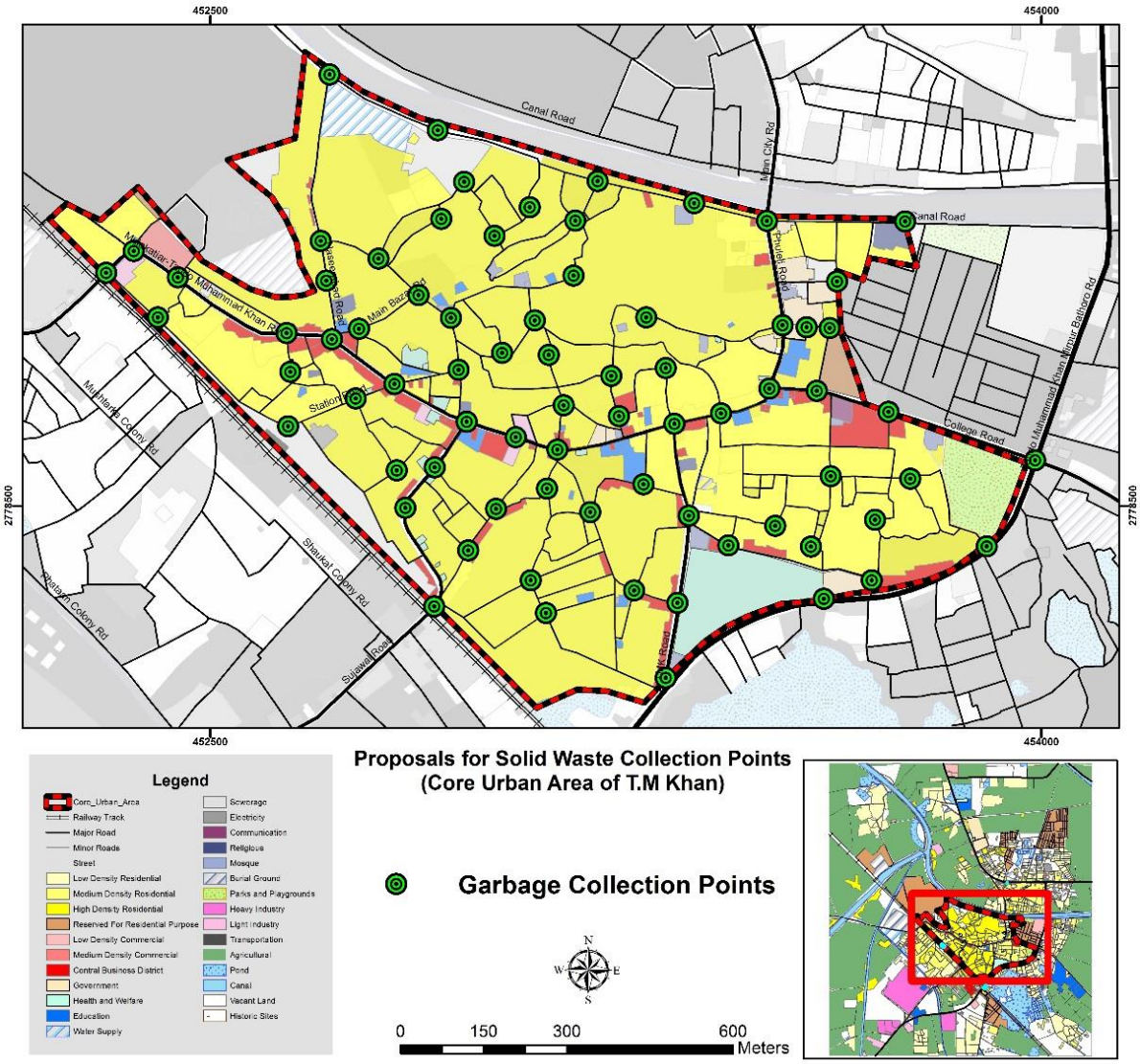



**Figure 8-12: Proposed Garbage Collection Points for Core Urban Area Tando Mohammad Khan**

## 8.4 Firefighting

### *8.4.1* Existing Situation

Currently there is one fire brigade station situated in Tando Muhammad Khan with 23[39] firefighting staff and one functional firefighting vehicle. The Municipal committee has no separate budget for firefighting and no vehicle maintenance facility in the station.

### *8.4.2* Need **assessment**

As the current total population of Tando Muhammad Khan Town is 101,863, which will be 162,410 in 2037. As per National reference manual the one fire station is recommended for 0.1 million population and one fire engine is required for 50,000 population. Currently there is one vehicle available with municipal committee. So 2 more vehicles are needed for DHQ Town.

### *8.4.3* Strategies

- City committee people would need to be trained about local early warning systems, evacuation, first aid search and rescue, firefighting etc.
- Provision of Sprinkler protection should be ensured in each multi story building for firefighting.
- Assure that all areas of the Town have the highest level of fire protection, at the lowest possible cost, to meet existing and future demand.
- Establishment of fire-stations to accommodate required number of fire vehicles.
- Establish sub-stations at different locations to ensure short response time for the whole city.
- Increase service efficiency through number of vehicles, dedicated staff and financial mechanism.
- To ensure readiness of all vehicles with ample stocks of POL and spares.

[39] MC office Tando Muhammad Khan

# 9. INFRASTRUCTURE

## 9.1 Transportation

### *9.1.1* Existing Situation

An efficient transportation system is essential for the movement of people and goods from one place to another in both urban and rural areas.

Tando Muhammad Khan is serving as one of main agricultural hub in this region. If we consider Karachi as CBD then Hyderabad region would become its engine and Tando Muhammad Khan would be its agricultural fuel. The town holds some major transportation link via every surface service.

Tando Muhammad Khan is facing traffic and transportation problems like most of other towns of Sindh. These problems are of typical nature. These include encroachments, haphazard on-street parking, improper design of roads and intersections, poor pavement conditions, absence of street lightening and non-uniform right of way. These problems are due to lack of proper enforcement, un-even development and lack of coordination between different stakeholders.

Commercial areas and markets are creating problems of traffic and parking. It includes Kiran Chowk, intersection of College with Tando Muhammad Khan-Mirpur Bathoro Road, intersection of Station Road with Tando Muhammad Khan-Mirpur Bathoro Road, Mulakatyar Road, and intersection of College Road with Phuleli Road and connection of Hyderabad-Badin Road with Tando Muhammad Khan-Mirpur Bathoro Road. The majority of traffic in these commercial areas is constituted by auto-rickshaws, chinkchi rickshaw, cars, delivery carts, Suzuki vans etc.

### *9.1.2* Regional Connectivity (Air, Rail, Road)

- **Airport**

  In actual Tando Muhammad Khan has direct access to Hyderabad Domestic Airport via Badin-Hyderabad (Provincial Road), but due to some technical reasons Hyderabad domestic airport is now closed for commercial traffic as of 2013. Approximately distance) from Hyderabad to Tando Muhammad Khan is 34 km (21 miles).

**Tando Muhammad Khan Railway Station**

- **Railway Station**

  The City is also linked with the national network of Pakistan Railways through Karachi railway line via Kotri-Hyderabad and Hyderabad-Badin Railway station (Hyderabad-Badin Branch Line).

- **Bus and Truck Stands**

There are no designated Bus and Truck stands within Tando Muhammad Khan. Inter-city buses are very limited and do not operate with regulations or proper stands. Illegal bus stands of public transport are evident in Tando Muhammad Khan. Unregistered Qingqi and Rikshaws are more than buses. Some bus and truck stands are observed on the periphery of District Tando Muhammad Khan which connects Tando Muhammad Khan to other cities / towns /Districts.

**Present Status of Road Network**

**a. Physical Condition**

Due to heavy traffic load, mixed mode of transportation, narrow and encroached right-of-ways (ROW) are the main characteristics. This situation results in traffic jams along less parking facility with less sense of civic rules and regulations. The situation is comparatively better in the new developments in the peripheral areas of the town. The physical condition of major roads has been discussed hereunder.

**b. Major Roads**

Road users experience a number of traffic related problems such as wrong parking, encroachments, wastage of time due to traffic delays, poor traffic management at intersections and unsatisfactory geometry / engineering designs of roads. Capacity of certain roads in the present system is reduced due to poor quality of maintenance riding surface, inadequate pedestrian pavement, poor lightening conditions and lack of properly designed intersections. During field data collection, it has been observed that in some areas road construction work is in the progress but less supervision. Following are the major roads within Tando Muhammad Khan town.

- Mulakatiar Road
- College Road
- Hyderabad-Badin Road
- Tando Muhammad Khan-Mirpur Bathoro Road
- Market / Masjid Aqsa Road

As Tando Muhammad Khan has less annual growth rate (2017 Census) the expansion of town towards north along Hyderabad road and some minor development towards Badin road have set the trend to develop land in Tando Muhammad Khan's peripheries but without vision along proper road pattern and planning. The designed population density is comparatively low, therefore existing and future traffic volume would be reasonable.

**c. Street Patterns**

There is no planned street pattern in town. By studying the historical facts and consultation with aged-group of people of Tando Muhammad Khan about growth of town, it reveals that

Tando Muhammad Khan was expanded along Hyderabad-Badin road as medium of development e.g. Linear Development.

### *9.1.3* Issues and Problems

- Tertiary and Secondary Roads are in very poor condition
- No formal Bus Terminal
- Traffic Congestion at intersections
- Improper design of roads and intersections,
- Unavailability of Traffic signals and street furniture
- Absence of street lightening and non-uniform right of way
- Encroachments and unorganized/illegal Qinqui and Rickshaw stands are also evident on the road side which causes on street and off street parking issues.
- Lack of Road Safety
- Road side encroachment is evident the in core urban area. Visitors are facing congestion and traffic problems in market due to encroachment and lack of parking spaces
- Drainage issues on road side are evident due to which roads are worsening day by day.
- There is unplanned street network and absence of public transport also poor maintenance of bus bays.

### *9.1.4* SWOT Analysis

| Strengths | Weakness | Opportunity | Threats |
|---|---|---|---|
| **LAND USE PATTERN AND TRANSPORTATION** | | | |
| 1. Mixed land uses (residential, commercial, industrial, administration)<br>2. Good national / regional connectivity through railway , air and road networks<br>3. Local public transport provisions by auto-rickshaws<br>4. Strong network of inter and intra city.<br>5. Sufficient road right of ways is available in intra city routes<br>(TM Khan – Badin Hwy) | 1. Unplanned street network<br>2. Absence public transport<br>3. Ribbon type commercial development in residential neighborhoods.<br>4. Poor traffic management.<br>lack opportunities for integrated transport provisions<br>5. Lack of coordination between different transport operating agencies.<br>6. No parking space for rest hours for drivers.<br>7. Lack provision of street furniture<br>8. Non-aesthetic streetscape | 1. Promotes compact development.<br>2. Activity centers (support local business)<br>3. Opportunities in the form of wide roads available for mass transit system development<br>4. Wider road space can be used to facilitate multiple transport activities by implementing road space design standards<br>5. Proper management can promote public transport services.<br>6. After removal of encroachments adequate space available for traffic signs, lane markings and foot paths | 1. Encroachments<br>2. Congestion<br>3. On street parking (paid/unpaid)<br>4. Reduced flow of traffic (low speed)<br>5. Security issues<br>6. Economic losses due to transporters strikes<br>7. Inconvenience due to traffic congestion<br>8. On street parking<br>9. Traffic congestion. |

| Strengths | Weakness | Opportunity | Threats |
|---|---|---|---|
| | 9. Haphazard on street parking reduces road capacity<br>10. Poor administration and management control<br>11. Encroachments around bus bays and railway land sites. | 7. If properly administrated and space utilized, could promote smooth flow of traffic on nearby corridors.<br>8. A new transport terminal for goods transport will facilitate timely supply of industrial goods. | |
| **LOCATION & CONNECTIVITY** | | | |
| 1. Proximity to Hyderabad via Hyderabad and Badin highway.<br>2. River Indus flow via phuleli canal through town.<br>3. It is surrounded by rich agriculture land parcels which supports its agro based economy.<br>4. Well connected to highway network that can be used for mass transit services. | 1. There is only one major route for connectivity.<br>2. There is no national highway passing through district.<br>3. River Indus causes severe seasonal floods.<br>4. Majority of town population resides in rural setting having less means of public transportation services.<br>5. Highway is not equipped to accommodate full functioning mass transit service. | 1. May grow as a large size green and planned settlement in future, if planned in accordance with appropriate planning measures.<br>2. A twin city model can be developed along both side of river canals in future.<br>3. More agro based industries, regional fruit and vegetable markets and on the basis of good agricultural potential for the distribution of these products an efficient transport network can be developed.<br>4. Contribution in positive regional and local economic development. | 1. Loss to local business.<br>2. Flooding<br>3. Contamination of canals.<br>4. Shortage of clean water for multiple uses.<br>5. Conversion of agricultural land for housing purpose.<br>6. Outdated mass transit services may came isolation, joblessness, loss of trade and business and increased fear of alternate transport modes. |

### *9.1.5* Policy Guidelines

- Decrease in private vehicles, especially during peak hours and in CBD areas.
- Decrease in traffic delay.
- Decrease/stability in air and noise pollution.
- Involvement of private sector in transportation infrastructure and services projects.
- Establishment of Mass Transit System.
- Efficient operations and effective regulation of transport services.
- Infrastructure development and up-gradation.
- Integration of public transport services and networks.
- Modernize goods transport and freight facilities.

### *9.1.6* Sindh Empowerment of 'Persons with Disabilities' Act, 2018 [40]

Keeping in view 'Persons with Disabilities' act, 2018 while planning, designing & executing any kind of infrastructure projects i.e. public places, markets, parks, educational institutions, health facilities, Roads Street and pathways centers and etc, it is now mandatory to apply Universal Design and Accessibility criteria for ease of access of differentially abled persons. Also during the planning & designing phase universal guidelines for differently abled friendly construction should adhered for e.g provision of ramps, specialized tiles (Tactile Paving) used for visually impaired personals, signage, street furniture, foot path steps, parking, mechanical access, railings, opening of doors & windows, toilet design, lighting and illumination and etc.

Specifically planning & designing for the transport sector, universal access is the goal of enabling all citizens to reach every destination served by their public streets and pathway system. Universal access is not limited to access by persons using automobiles. Travel by bicycle, walking, or wheelchair to every destination is accommodated in order to achieve transportation equity, maximize independence, and improve community livability. Wherever possible, facilities are designed to allow safe travel by young, old, and disabled persons who may have diminished perceptual or ambulatory abilities. The universal design has following principles;

**i. Universal access to destination:**

All destinations served by the public road system shall be accessible by pedestrians and by drivers of all vehicles (including bicycles), except that vehicle operation may be restricted for reasons of excessive weight, noise or size, or extraordinary potential for damage to property or person

**ii. Equal Right of use:**

People's right to use that portion of a street designed for travel is not diminished by less weight, less size, or less average speed associated with their travel mode. Demand actuated tra-c signals

[40] For detail please refer; The Sindh Empowerment of 'Persons with Disabilities' Act, 2018 (https://depd.sindh.gov.pk/sindh-empowerment-of-persons-with-disabilities-act-2018)

must detect and serve a diversity of users including bicycle operators in the roadway and pedestrians using crosswalks.

iii. **Accessible surfaces:**

To the extent practicable, travel surfaces should accommodate travel on foot with minimal trip hazards and via common assistive devices such as wheelchairs. Roadway surfaces should be as clear as possible of hazards for narrow tires such as bicycle wheels.

iv. **Crossable Roadways:**

Crossing distances at non-signalized access locations must not exceed the distance that can be covered at walking speed before tra-c may arrive from beyond sight distance, or during reasonable gaps in roadway tra-c. Refuges provided to reduce crossing distances should be large enough to store assistive devices such as wheelchairs and strollers. Tra-c signal timing should provide adequate clearance intervals for safe crossing by pedestrians and slow vehicles.

It is suggested that necessary provision of the above recommendation may be mandated in the laws and regulations of SBEA and other agencies which drafting the buildings and highway regulations

### *9.1.7* Strategic Development Plan

The aim of strategic development plan is envisions providing equal and equitable sustainable transport system to all groups of society on affordable basis with minimal impacts on environment, also Provision of Citizen-centric, Sustainable and Growth Oriented Modern Transport system and rehabilitation of existing roads.

i. **Long Term**

- Create Traffic Engineering Bureaus (TEBs) at divisional level to perform functions as specified in Karachi Division (Traffic Engineering) Act 1985.
- Environmental Impact Assessment (EIA) should be mandatory for all transportation projects.
- Declaring private vehicle free zones, especially in peak hours, in CBD areas to reduce noise and air pollutions.
- Satisfy mobility needs via integration of existing and planned routes, services and Infrastructure.
- Implementation of Axle Load Management.
- Dualization of main arteries.
- Improvement of existing roads geometry.

ii. **Short Term**

- Expansion of railway station
- Improve road design to make safer roads.
- Prevent encroachments on footpaths through litigation.
- Rehabilitation of Farm to Market road network.
- Reduce traffic growth and congestion by achieving a mode shift.

### *9.1.8* Priority Projects:

**i. Repair and Rehabilitation and Improvement of Major Roads, Minor Roads and Streets (excluding Core Urban Area)**

- **Project Justification**
  The communication linkages of Tando Mohammad Khan with other parts of regions are imperative for overall economic progress of the region and boosting services industry itself in Hyderabad and its surroundings. There is an unplanned & haphazard street network & absence of quality public transportation system in DHQ Town. Major roads & junctions i.e. Hyderabad-Badin Road, College Road, Phuleli Road, Mullakatiar Road, Civil Hospital Road, Mirpur Bathoro Road and Tando Adam Road needs repair rehabilitation with allied missing facilities. However, the overall situation indicates narrow street width, poor pavement conditions, encroachments on footpaths and road sides, haphazard and illegal parking, open drains, lack of traffic signals and signs, etc. Space along with major roads is available for provision of missing facilities.
- **Project Benefit -**By implementation of the project agricultural, industry sector could be enhanced.
- **Implementing Authority-**Government of Sindh, TMK MC, Works and Services Department TMK.
- **Estimate Cost:** 500 million approx (Depending upon length of roads).

### ii. Installation of Traffic Signals and new Solar Street Lighting on Main Roads

- **Project Justification**
  Most of the Streets of Tando Mohammad khan are without street lights in over all the town and all roads and are devoid of this facility. Street Lighting is essential for safe maneuvering of vehicles at night time and enhance sense of security of pedestrians on roads in dark hours. Given the energy crisis in the country, it is recommended to have solar street lights on streets and major roads.

- **Implementing Authority –** Tando Mohammad khan MC, Government of Sindh

- **Estimated Cost: 456.12 Million PKR Approx.**

| S. No. | Project Name | Estimated Cost In Millions | ADP | Non ADP | Status | |
|---|---|---|---|---|---|---|
| | | | | | Short Term | Long Term |
| **Roads and Communication Network** | | | | | | |
| **1** | Repair & Rehabilitation of Major & Minor Urban Roads (Excluding Core Urban Area) (Approx. 15,294 meters @ rate of 4500 per running meter) 68.82 Million<br><br>Repair & Rehabilitation of Streets (Excluding Core Urban Area) (Approx. 114,919 meters @ rate of 4500 per running meter) 287.30 Million<br><br>**Lump sum Amount 100.00/ Million**<br>• Pedestrian pathways<br>• Designated Parking Spaces<br>• Provision of Footpaths and Street Furniture<br>• Installation of traffic signals & new solar Street Lighting On main roads | 456.12 | - | Non ADP | **Short Term** | - |

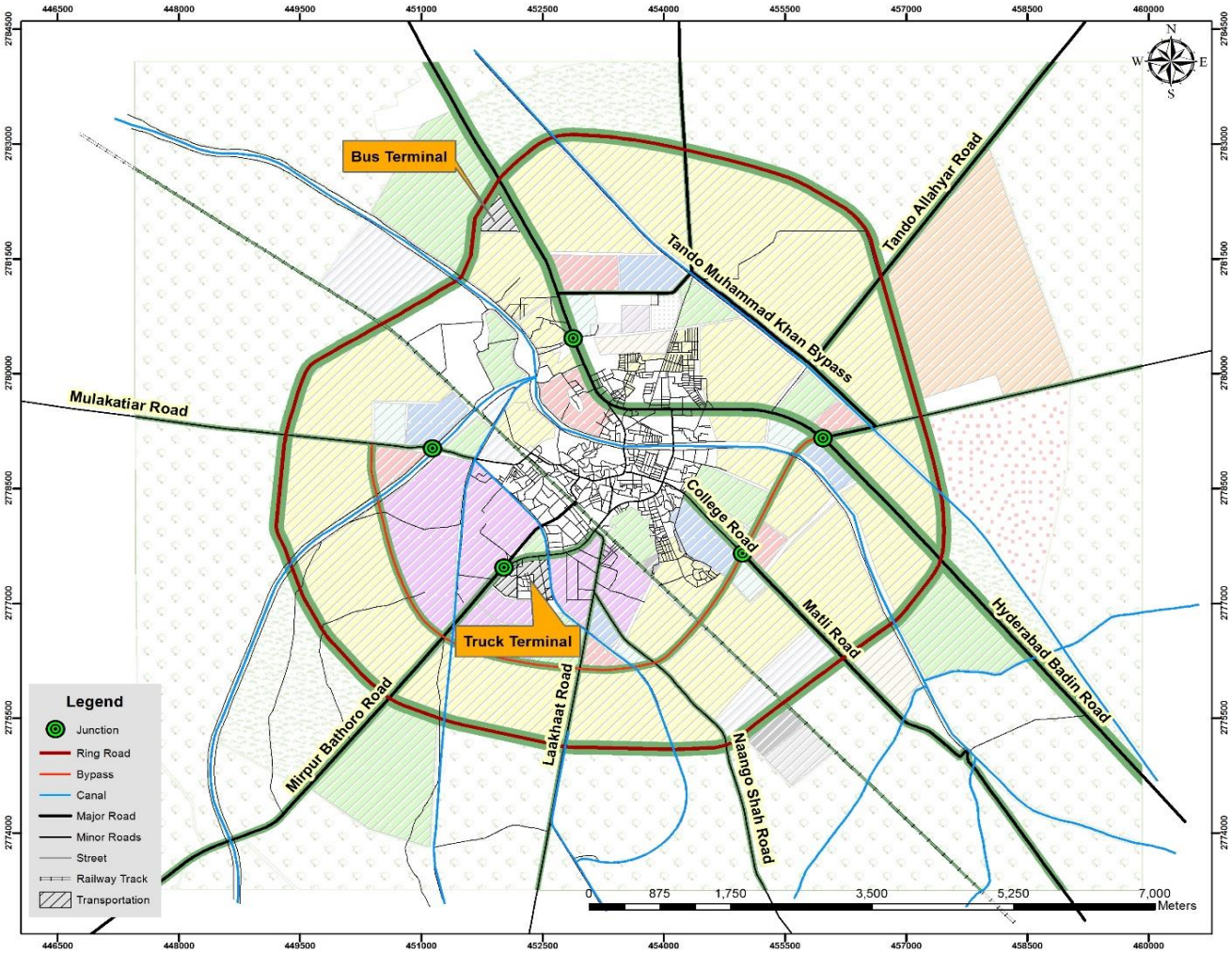
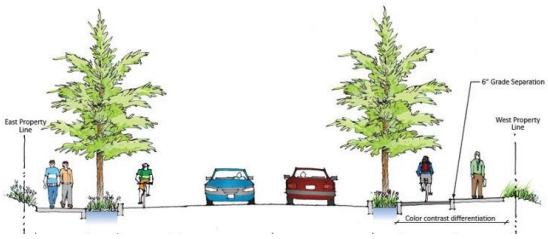



**Figure 9-1: Proposed Transportation Landuses for Tando Mohammad Khan**

### *9.1.9* Immediate Action Plan

- **Repair & Rehabilitation of Existing Roads of Core town Area**

Rehabilitation of the roads including Phuleli Road, Civil Hospital Road, College Road, Mirpur Bathoro Road and Mulakatiar Road, etc.




The main parameter for rehabilitation of existing roads is to draw a property line, which require very practical approach in such a way that no massive destruction will happen. In this regard community participation will be highly needed to take them on board and to make awareness that this realignment is for the betterment of their area. Thus, the community ownership will make the idea workable, other than this forceful action will not work in long run. List of proposed projects in immediate action Plan for betterment of the existing roads located in Core Urban Area are given below;

| Tando Muhammad Khan - Core Town Area Rehabilitation of Roads | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **S. No.** | **Name of Road Major & Minor Road** | **Length (km)** | **Length (m)** | **Width (ft)** | **Width (m)** | **Area (sq.m)** | **Cost / Sq.m** | **Total Cost (PKR)** |
| 1 | TMK Road | 0.31 | 313.81 | 40 | 12.20 | 3,828.46 | 4,500 | 17.23 |
| 2 | College Road | 0.20 | 200.16 | 40 | 12.20 | 2,442.00 | 4,500 | 10.99 |
| 3 | Sujawal Road | 0.00 | 5.00 | 40 | 12.20 | 61.00 | 4,500 | 0.27 |
| 4 | Phuleli Road | 0.59 | 587.42 | 40 | 12.20 | 7,166.52 | 4,500 | 32.25 |
| 5 | Mulakatiar Tando Muhammad Khan Rd | 0.76 | 755.92 | 40 | 12.20 | 9,222.27 | 4,500 | 41.50 |
| 6 | Phuleli Road | 0.32 | 319.90 | 40 | 12.20 | 3,902.74 | 4,500 | 17.56 |
| 7 | TMK Road | 0.15 | 153.48 | 40 | 12.20 | 1,872.44 | 4,500 | 8.43 |
| 8 | Sujawal Road | 0.39 | 386.56 | 40 | 12.20 | 4,716.05 | 4,500 | 21.22 |
| | | | | | | | **Total PKR Rs. Million (A).** | **149.45** |
| **Streets** | | | | | | | | |
| 1 | Streets | 17.82 | 17,824.00 | 20 | 6.10 | 108,726.40 | 2,500 | 271.82 |
| | | | | | | | **Total PKR Rs. Million (B).** | **271.82** |
| | | | | | | | **Total PKR Rs. Million (A+B).** | **421.27** |

- **Monuments**

  Repair and rehabilitation of Kiran Chowk is proposed on immediate basis for beautification purposes. Lump sum amount of Rs.3.00 million for rehabilitation of Kiran Chowk of Tando Mohammad khan.

- **Pedestrian Movement and Street Furniture**

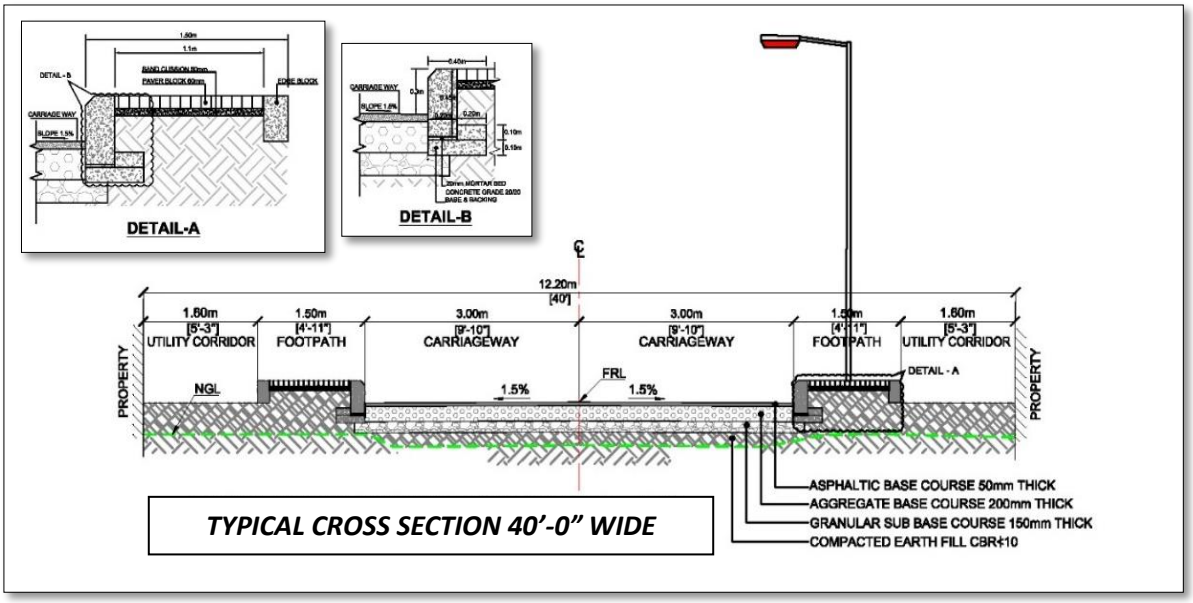
  Pedestrian movement will be encouraged in core urban area by restoring footpaths on both sides of the roads in the city center. All existing encroachments on the footpaths should be removed to allow walkability in the city center. Additionally some walkways should be designed in the CBD area by applying the pedestrianization policy there.

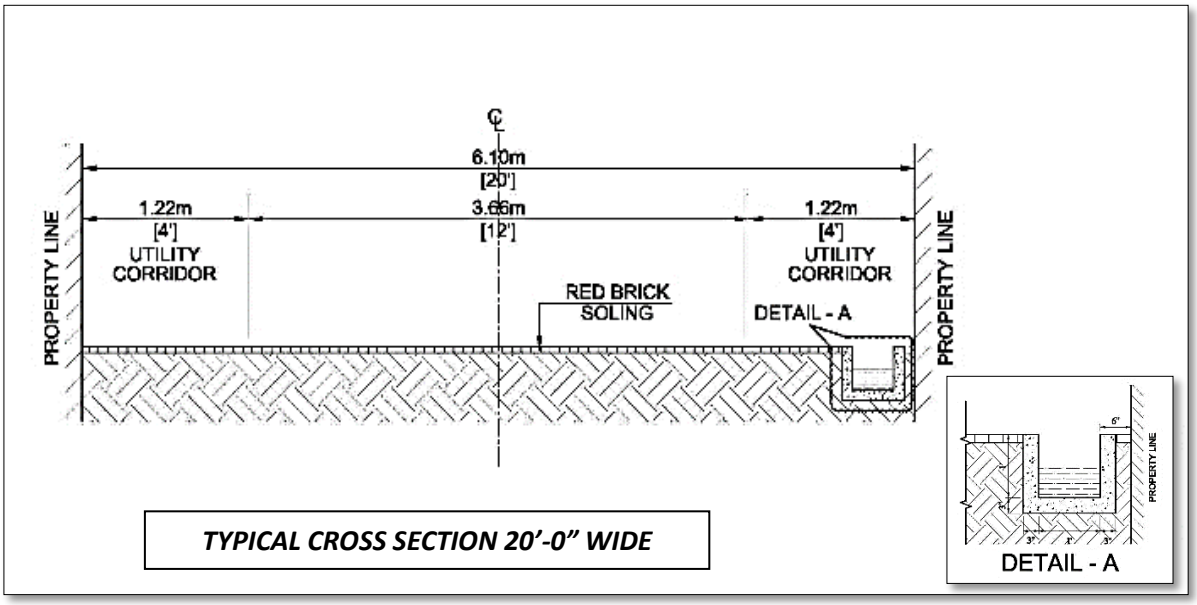
**Figure 9-2: Model walkways And Street Furniture**

- **Provision of Footpaths and Street Furniture**

  Provision of street furniture in the core urban area also needs immediate attention. Street lights, benches, footpaths restoration, traffic signals, zebra crossings and bus stops with shades should be installed on immediate basis.

**Sample Typical Road Cross section for Major & Minor Roads is given as below;**



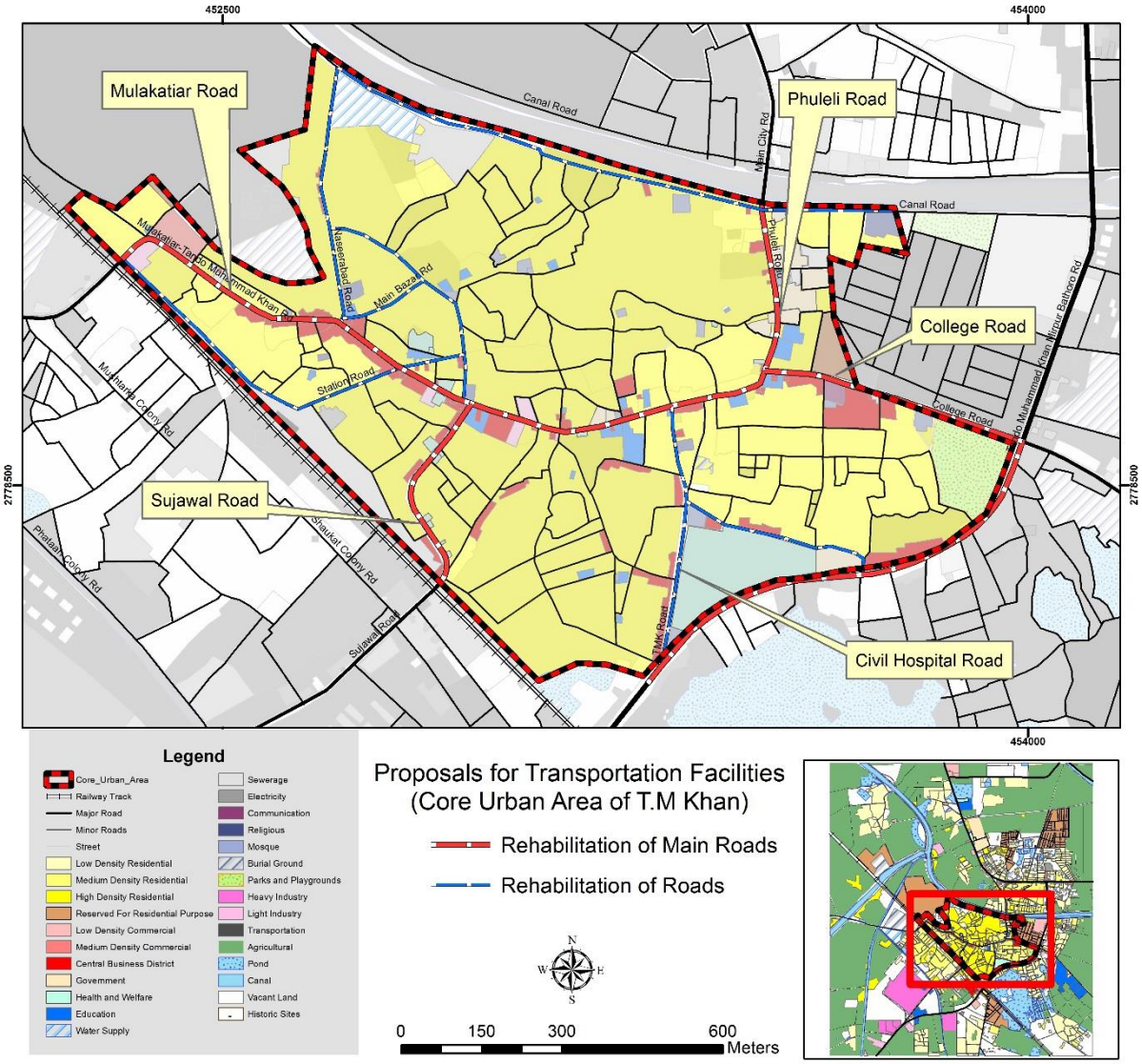



**Figure 9-3: Rehabilitation of Existing Roads of Core Urban Area of TMK**

## 9.2 Communication

### *9.2.1* Telephone, Mobile, Internet

The present-day situation of Tando Muhammad Khan falls in the developing urban area; there are about 2,673 households and commercial sectors using land line connections. There are 90 public call offices in the area. Also, about 45,000 users are using mobile phones.

**PTCL office in Tando Muhammad Khan**

The present survey revealed that in Tando Muhammad Khan only 21 households have PTCL land line, which means that about 1051 have PTCL land line telephone facility and remaining are using cell mobile phone. The numbers of households using mobile cell phones are more than 12411. About 2953 households are using internet out of 14,012 households.

About 11,292 numbers of households are using internet and remaining 74,520 are still not aware / don't want to use this new technology.

At present the internet usage is limited to educated families, and it is by the pace of time increasing with the decline of illiteracy rate.

### *9.2.2* SWOT Analysis

| INFORMATION & COMMUNICATION TECHNOLOGY | | | |
|---|---|---|---|
| **Strengths** | **Weakness** | **Opportunity** | **Threats** |
| 1. Strong networks available for advanced technologies, e.g. internet, cellular networks, broadcasting, satellite communication.<br>2. All cellular service provider offer facilities and service station.<br>3. Town is covered by PTCL services, station and network. | 1. Lack of information dissemination regarding agricultural activities, public health, veterinary, disaster forecasting etc.<br>2. Most of the areas lack the coverage of PTCL network coverage. | 1. Media can play important role in economic development and prosperity.<br>2. Immediate disaster forecasting through disaster emergency response center.<br>3. Marketing campaign support of development initiative. | 1. Negative cultural and ethical exposure to young minds (youth), if not regulated properly.<br>2. No check and balance of non-authorized/ non-biometric SIM's usage. |

### *9.2.3* Importance of Communication Infrastructure in Agriculture Sector:

Swift transportation facilities, farmer friendly marketing arrangements and, above all, a well-maintained Communication network are the basic requirements for an efficient and profitable agricultural sector. The District government needs to improve market and support service infrastructure including farm-to market Roads. This sector will need increased and sustained investments in communication infrastructure in rural areas.

## 9.3 Energy

### *9.3.1* Existing Situation

There is no power generation facility in Tando Muhammad Khan (MC) vicinity. The power supply is through HESCO-WAPDA transmission system. HESCO officials in TANDO MUHAMMAD KHAN were not cooperative to provide required data but consultant succeeded to acquire some data from different sources.

**Table 9-1: Electricity Connection Status in Tando Muhammad Khan District**

| Sr. No. | NAME OF UNIT | URBAN | RURAL |
|---|---|---|---|
| 1 | Power Houses | 0 | 0 |
| 2 | Gird Stations | 1 | 1 |
| 3 | Domestic Connections | 7,700 | 9,447 |
| 4 | Commercial Connections | 3,200 | 637 |
| 5 | Agricultural Connections | 0 | 490 |
| 6 | Industrial Connections | 243 | 3 |
| 7 | Villages without Electricity | 0 | 221 |

*Source: Department of Education, TANDO MUHAMMAD KHAN (http://Tando Muhammad Khanhanedudept.comyr.com/Lang.html)*

Results of primary data reveals that, 91.44% of the households have availability of electric power, whereas 8.55% of the household does not have electric power.

**HESCO Supply Urban Feeders**

The power supply from HESCO HT feeders 220KV & 132KV is stepped down to 11KV at grid stations and distributed to consumers via power main transformers which further reduce the voltage to 420V/220V as

required by the individual households. The distribution network to be improved by using Aerial bundled cables (ABC) to avoid theft of electricity.

The survey also bring the fact that about 11,310 households in Tando Muhammad Khan have no alternative power source, some 250 houses have solar energy and only one household has wind power.

**Current Power Supply/Demand**

Electric power network exists in the city, but the production is going through a national energy crisis and power supply has become erratic. The Power Supply to District Tando Muhammad Khan is through Hyderabad Electric Supply Company (HESCO) WAPDA via 220/132 KV Tando Muhammad Khan grid station feeding district by 11 KV feeders. The distribution system will be needed to be extended to the new areas absorbing future urban growth

The power demand is not only for houses & business, but also for street lighting, industry and irrigation. The main industrial units are sugar mills, flour mills and rice mills. The electricity consumers in the district (MC) Tando Muhammad Khan are categorized as domestic, commercial, industrial, agriculture and other services. The major portion of electricity generated is being consumed by domestic sectors, followed by industries.

**Street Light Network**

In Tando Muhammad Khan there are 641 street lights in almost all areas and markets, but few are not in order or bulbs are fused. These require regular inspection/maintenance and replacement of the fused bulbs.

In some locations 170 LED Street lights have been installed, it is recommended that street lights be switched with LED and power supply can be taken from the day light by means of solar panel and a storage battery. This can save energy and light can be on even during the load shed hours.

### *9.3.2* SWOT Analysis

| POWER SUPPLY & DISTRIBUTION | | | |
|---|---|---|---|
| **Strength** | **Weakness** | **Opportunity** | **Threats** |
| 1. Electricity supply network for urban area.<br>2. Almost whole urban area gets coverage of electricity.<br>3. Good recovery outcomes as business community in urban area want quality services.<br>4. The industrial sector demands supply of natural gas.<br>5. There are good local potential for electricity generation. | 1. Shortage of electricity & power supply.<br>2. Poor maintenance of electricity supply infrastructure.<br>3. Power shortage due to non-payments of bills.<br>4. Line losses and power theft.<br>5. Outdated network in old town areas.<br>6. Existing capacity of electricity supply is short to meet the growing demand of utility. | 1. By increasing the capacity of grid station will minimize electricity shortage & maximize production<br>2. Opportunities available for alternative energy production through solar energy and wind power.<br>3. Renewal of outdated network to meet existing and future demand. | 1. Load shedding.<br>2. Threat to agriculture and industrial production and overall economy.<br>3. Crime rate.<br>4. Political will and policies at work<br>5. Licensing and legal issues.<br>6. Investment protection, law & order. |

### *9.3.3* Issues and Problems

- Advocacy efforts have not been made to promote efficient fuel use; consequently, there is little public awareness about fuel conservation measures,
- Alternative fuel sources are scarce and expensive. Liquid Petroleum Gas (LPG) and kerosene are available but costly, putting them out of the reach of the rural poor
- Maintenance of power plants
- Circular Debt
- Transmission and distribution losses are directly connected to Leakage Current Losses, Dielectric Losses, open circuit Losses and theft of electricity.

### *9.3.4* Strategic Development Plan

**<u>Strategies for Electricity includes:</u>**

- The effective development of low cost energy production systems can be used
- To offset water scarcity by either deep drilling for freshwater or direct desalinization of brackish water.
- Success in achieving fuel efficiency, adopting new technologies and altering existing fuel-use

- Habits depends largely on women who are the primary users of fuel wood. They must be made aware of the long-term ramifications of adopting these innovations
- Addition of sub stations as per requirement
- Encourage energy efficient building construction
- Up gradation of grid station
- Promote energy efficient appliances and devices
- Feasibility study for alternate energy sources (Solar, wind, biogas etc)

## Proposed Utilities and Services Landuse for Tando Muhammad Khan Town

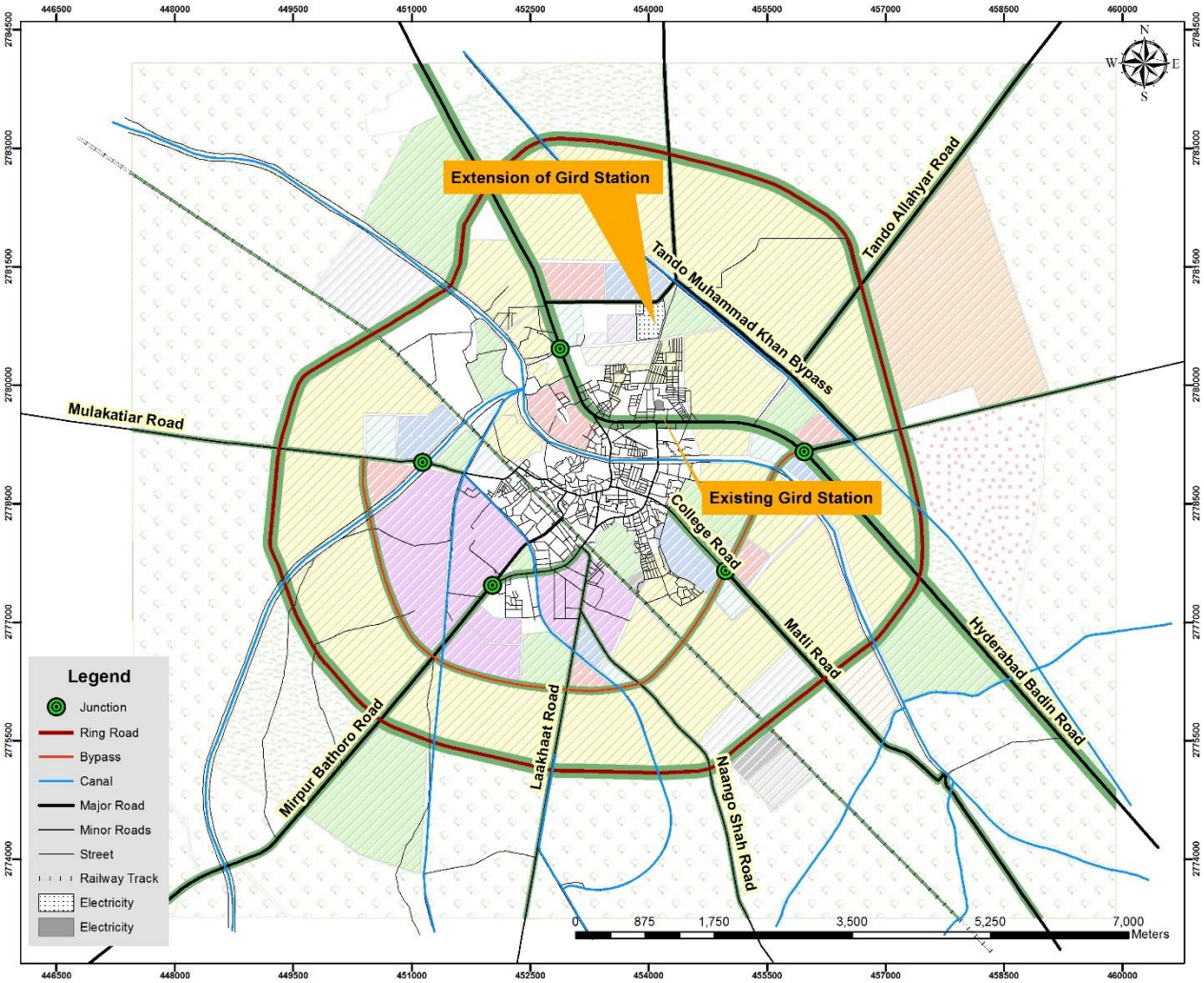


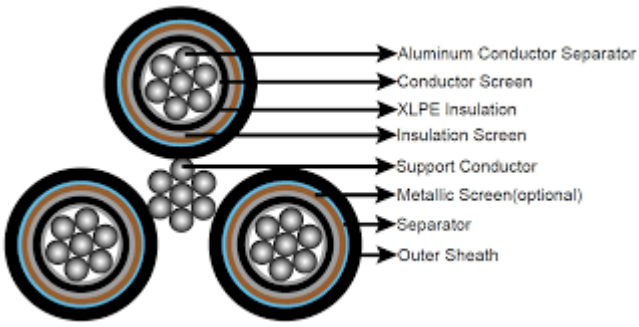

**Figure 9-4: Proposed Landuse for Electric Power Related Services for Tando Mohammad Khan**

### *9.3.5* Immediate Action Plan

ABC wires should be used in the core urban area to avoid short circuits and thefts. This will also increase the beauty of the core urban area.

**i. Arial Bundle Cable wires**

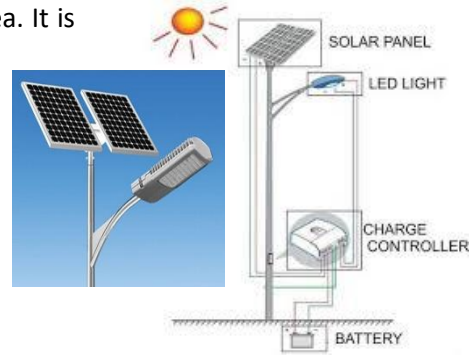
In present circumstances it is suggested that Arial Bundle Cable wires should be used to avoid short circuits and thefts issues. This will also increase the aesthetics and beauty of the core urban area.




**ii. Streetlights**

It is proposed to installed streetlight in all over core urban area. It is suggested to use streetlights with LED panel and solar power battery support. This can save energy and light can be lit even during the load shedding hours, but need regular maintenance. Considering, narrow streets and road width, it is recommended to use wall mounted poles in narrow streets, while floor mounted poles on other roads.

- Up gradation of existing grid station
- Promote energy efficient appliances and devices




| Proposed Wall Mounted Street Lights | | | | |
|---|---|---|---|---|
| **S.No** | **Name** | **length (m)** | **Length (feet)** | **Cost (PKR)** |
| 1 | Proposed Total Length of Street (km) for wall mounted streets lights. | 20.00 | 65,617 | 16,404,200.00 |
| | | | **Total Cost (PKR). Million** | **16.40** |

- Each wall mounted street light cost (Rs. 5000/-).
- As per total length of Streets for this proposal 3,281 No.s of street lights/wall mounted streets should be placed in core town area.
- Operation and maintenance is the 1st priority to ensure after installation of all equipment's and machinery and kept under strict control of TC office for proper usage of facilities.

## 9.4 Gas Supply

### *9.4.1* Existing Situation

271 houses residents had responded to the questions asked on availability of Gas. As given in the Table below, 213 houses had the gas available to them, while the gas was not available to 57 houses. Therefore about 79% households have the gas supply by SSGC and 21% were using alternate source of fuel for their daily household needs.

| Availability of Gas | % |
|---|---|
| **Available** | 79% |
| **Not Available** | 21% |
| **Total** | 100% |

Households not having Natural Gas provided by SSGC are dependent of alternate sources. 53 out of 57 respondents not having gas availability are using following alternate resources.

| Alternate Sources | % |
|---|---|
| **Wood** | **89%** |
| **Gas Cylinder** | **6%** |
| **Wood, Gas Cylinder** | **2%** |
| **Coal, Wood** | **2%** |
| **Wood, Kerosene oil** | **2%** |
| **Grand Total** | **100.00%** |

An around 40% of the households suffer from low gas pressure whereas 60% of the households are satisfied with the Gas pressure.

The Survey result also reveals that 80% of the households do not have gas load shedding. While only a few of the households complain that 2-3 hours gas load shedding is being done in their area on a daily basis. Following table depicts the overall results.

### *9.4.2* Strategic Development Plan

- Feasibility study for alternate resources available
- Measures to cater Load Shedding of both electricity and gas
- Measure to appropriately priced the energy resources

# 10. ENVIRONMENT

## 10.1 Existing Situation

The town is located at 25°8'N and 68°32'E at an elevation of 11 meters on the right bank of Phuleli canal (old name of Phuleli was Gooni) at distance of 21 miles from Hyderabad.

In north of the Tando Muhammad Khan district, Hyderabad and Tando Allahyar Districts are located; Badin District lies on south and east; and West boundary is shared by District Thatta. The Indus River flows through Northwest. Tando Muhammad Khan district comprises the three talukas of Tando Muhammad Khan (also the biggest town in the district), Bulri Shah Karim and Tando Ghulam Hyder.

The Indus delta is bounded on the west by the fold and Thrust Mountains of collision zones and on the north by the Himalayan thrust, by the Arabian Sea to the south and Thar Desert to the east .It is mainly fed by the Indus River and its tributaries.

The Seismic zoning map of Pakistan (2015) places Tando Muhammad Khan in Zone 2A which corresponds to possibility of minor to moderate seismic hazards i.e. probability of earthquakes of intensity (MM Scale) 6 to 7.5. Accordingly, a seismic risk factor of 0.1 needs to be incorporated in the design for constructions and installations in the coastal zone, for operational basis earthquakes (OBE) pertaining to damage due to moderate level earthquakes.

District Tando Muhammad Khan has a well-established irrigation system. The names of main canals and branches are Phuleli canal, Akram wah, Ginyari canal and Guni wah. In addition to this, there also exist some Sim Nalas in taluka Tando Ghulam Hyder & Bulri Shah Karim under the command of Sindh Irrigation & Drainage Authority (SIDA).

Agriculture, in Tando Muhammad Khan, mainly depends upon canal irrigation. However, other modes of land irrigation like river water and tube wells are also used. The four canals that off take from Sukkur barrage includes: Khairpur Feeder (West), Khairpur Feeder (East), Nara canal, and Rohri canal. They provide irrigation supplies to parts of Khairpur, Naushero Feroze, Shaheed Benazirabad, Hyderabad, Matiari, Tando Allahyar, Tando Mohammed Khan, Sanghar, Mirpur Khas, and Umerkot, districts.

Phuleli canal flows through Tando Muhammad Khan city. And the River Indus flows at a distance of approximately 17 km on the west along the district boundary. The city has a well-established system of canals.

Generally, the left bank is underlain with saline groundwater unsuitable for agriculture and domestic and potable use. The fresh groundwater is mostly restricted to the narrow corridor along the Indus River, and occasional lenses and perched water. In the freshwater zone, freshwater is mostly pumped by the private

tub wells to supplement the canal supplies. In the saline groundwater zones the public sector tube wells drain out groundwater to dispose that into canals or in to the drainage network.

As per the consultant analysis of groundwater quality, it is observed that the groundwater is not fit for human consumption and is contaminated with heavy metals like Antimony, Cadmium, Mercury, Barium and Boron. Also the water is bacteriologically contaminated.

High surface water deliveries have given rise to widespread waterlogging. The overgenerous surface irrigation supplies, especially in some canal commands, reduce the need for additional groundwater irrigation. Several studies have also argued that in many areas of Northern Sindh, a layer of fresh water is present over the more saline water that could be exploited more extensively by skimming well

### *10.1.1* Ecologically Sensitive Areas

#### a) Forest resource

There are three major types of forests in the study areas viz irrigated plantations in the command area of Sukkur, Guddu and Kotri barrages and coastal forests along the coast. Rangelands located in Kohistan and Raghistan areas are also declared as protected forests. All these forests are managed by the Forest Department Government of Sindh.

#### b) Irrigated Plantations

Irrigated plantations of Sindh, also known as inland forests, were once riverine forests but isolated from Indus waters by earthen embankments constructed in the 1930s. Presently, these plantations are irrigated from Sukkur, Kotri, and Guddu barrage irrigation systems.

### *10.1.2* Ecological Baseline

The central part of the district is dominated by agricultural fields and human habitations. A well-developed irrigation system is present to supplement the agriculture activities in the area. In addition, drainage system has also been constructed for the treatment of waterlogged areas.

#### a) Flora

Because of conducive weather and fertile land, the flora in Tando Muhammad Khan thrive. Among common trees and plants are Neem, Ber, Shisham, Eucalyptus, Babul, Jaman, Gul mohar, Kachnar, Conocarpus, Chikoo, Bougainvillea, cassia, Chota Gulmohar, Tecoma, etc.
Of more concern would be damage to old plantations of Azadirachta indica (Neem), Albizialeb bek (Shrin), Ficus religiosa (Peepal), Acacia nilotica (Babul), Cordia myxa (Lasura) and Ficus benghalensis (Borh), and recent plantation of Cornucopias. These trees have significant medicinal value or are important culturally.

Among the grasses; Lumb (Arislida depressa), Chemmer (Eleusine compressa), Gorkha (lasiurus sindicus) and Kana (Saccharum bengalensis) are found in the district. Koondeor Dib (Typha augustata) is found long the water ponds scattered on both sides of the roads.

**b) Fauna**

Tando Muhammad Khan City area was rich in wildlife, but these have reduced due to urbanization. Jackal, squirrel, fox, rats, mongoose and several species of bats are found in the area. Domestic animals including goats, sheep, camel, cows, donkey and buffalo. Reptiles include snakes such as cobra, rattlesnakes and rat eater snakes. Turtles are also present in the area especially in the vicinity of moist lands, ponds, canals and during rainy seasons.

Important bird species found in the district area are the common crow (Corvusbrachyrhynchos), common mynah (Acridotherestristis), house sparrow (Passer domesticus) and common teal (Anascrecca). These birds are frequently visible along the roadside. Grey and black partridges (Perdixperdix and Melanoperdixniger), though present in the area, have been reduced to a minimum quantity due to excessive hunting.

### 10.2 SWOT Analysis

| Strength | Weakness | Opportunity | Threats |
|---|---|---|---|
| **ENVIRONMENT** | | | |
| **URBAN AREA & AREAS SUITABLE FOR URBAN DEVELOPMENT** | | | |
| 1. Land available for future development within town urban boundary. | 1. Loss of agricultural land through land development for housing purpose<br>2. Water logging<br>3. Unplanned growth inside town.<br>4. Lack of utility services | 1. Mixed land uses may create activity centers.<br>2. High density will overcome housing shortages | 1. Land grabbing<br>2. Slums<br>3. Unplanned growth<br>4. Threat to agricultural land<br>5. Private sector may increase the cost of services. |
| **LAND** | | | |
| 1. Flat fertile land suitable for development<br>2. Rural rich fertile agriculture land that produces quality crops. | 1. Unplanned land uses<br>2. Limited availability of govt. land for future spatial growth<br>3. Incomplete development of agricultural land parcels (scattered agricultural growth)<br>4. Poor administration by agencies monitoring urban growth of the city. | 1. If treated through appropriate urban design principals & standards, can be transmitted into mixed land uses and strong activity centers.<br>2. May increase productivity cultivated at full strength. | 1. Land shortage for new development.<br>2. Slum formation<br>3. Contamination of land in un-irrigated areas. |

| Strength | Weakness | Opportunity | Threats |
|---|---|---|---|
| **FRESH WATER BODIES** | | | |
| 1. Huge irrigation canal based network available<br>2. Inland of fisheries water ponds exists. | 1. Water contamination due to waste disposal<br>2. Rice Canal used for raw sewage disposal<br>3. Contamination of standing water bodies created by rain and flood water at open lots is an invitation to malaria and dengue | 1. Temporary water bodies can be used for fish farming. | 1. Contaminated water is a serious threat for human health<br>2. Standing water gives birth to diseases<br>3. Threat to agricultural land<br>4. Affect agricultural production<br>5. Water logging |
| **CLIMATE** | | | |
| 1. Suitable for producing crops. | 1. Rainfall shortages affect the efficiency of canal system. | 1. Agricultural practices can be changed in accordance with weather condition for maximum production | 1. Droughts<br>2. Heavy rains Climate change affects agricultural production |
| **AIR** | | | |
| 1. Air quality in the rich agricultural belt is good for human health, and also keeps ecological balance in atmosphere.<br>2. Most of the area is air pollution free. | 1. Inner city air is polluted by high volume of traffic<br>2. Rice production adds moisture in air. | 1. Development planned with respect to air circulation can provide relief to inner city's polluted environment.<br>2. In future the town can be planned as Green City. | 1. Air pollution<br>2. Respiratory diseases |

## 10.3 Issues and Problems

- Water logging and salinity
- Water Contamination
- Low quality of surface water that is not fit for drinking
- Seismic Risk
- Aging of surface drainage canal system
- Inner city air is polluted by high volume of traffic.

## 10.4 Policy Guidelines[41]

- Enhancing role of local governments in sustainable management of natural resources
- Conservation of biological diversity, protection and sustainable use of indigenous flora and fauna
- Management of irrigated and linear plantations

[41] National Forest Policy 2010

- Promotion of indigenous species
- Increase the efficiency of surface drainage.

## 10.5 Strategic Development

### i. Long Term Plan

- Drainage can be improved on many sites and is the first thing to consider once a waterlogging problem has been identified. Options might vary from shallow surface drains (ie. Spoon- and 'W'-drains) to more intensive drainage using wide-spaced furrows, to the intensive drainage form of raised beds.
- Achieving sustainable development, while overcoming environmental challenges such as land degradation, watersheds and marine fisheries, deforestation, waste management and pollution control, and climate change.
- Multi-pronged approach to fisheries management should be adopted that takes account of economic, environmental, and social performance.

### ii. Short Term Plan

- Ensuring environmental sustainability
- Need of Permits to discharge waste and pollutants into the environment;
- Restoration and maintenance to preserve ecological cycles, functions and services of environment
- Increase the productivity of rangelands
- Rehabilitate degraded ecosystems and create environmental awareness
- Develop and implement policies that integrate the objectives of conservation and development to reduce pressure and protect environmental values and conserve biodiversity
- Fostering public-private partnerships
- Rehabilitation of Irrigated plantation
- Enhance Rangeland production and planting fodder trees for farmer community
- Improvement and Rehabilitation of Forests Parks
- Afforestation of Blank Reaches along Important Highways

### 10.6 Immediate Action Plan

Considering the dry and hot summers in the area, it is suggested to enhance tree plantation with urban forest. Thus local trees like Neem, Ber, Shisham, Eucalyptus, Jaman, Gul Mohar, etc. would be preferred to add beauty in the core urban area and better environment.

**Gul Mohar Tree**

**Shisham Tree**

# 11. DISASTER RISK MANAGEMENT

## 11.1 Existing Situation

The land of Tando Muhammad Khan is very fertile because it constitutes the rich alluvial deposits of river Indus. The area is part of the Southern Indus Basin, which is situated at south of the Sukkur rift. The area's geology is primarily composed of sedimentary rocks.

In north of the TM Khan district, Hyderabad and Tando Allahyar districts are located; Badin district lies on south and east; and West boundary is shared by district Thatta. The Indus River flows through Northwest. Tando Muhammad Khan district comprises the three talukas of Tando Muhammad Khan (also the biggest town in the district), Bulri Shah Karim and Tando Ghulam Hyder.

The topography within 2 miles of Tando Muhammad Khan is essentially flat, with a maximum elevation change of 66 feet and an average elevation above sea level of 57 feet. Within 10 miles is essentially flat (240 feet). Within 50 miles contains only modest variations in elevation (1,516 feet).

The area within 2 miles of Tando Muhammad Khan is covered by cropland (74%) and bare soil (17%), within 10 miles by cropland (75%) and bare soil (23%), and within 50 miles by cropland (63%) and bare soil (32%).

**Table 11-1 : Hazards Matrix of Tando Muhammad Khan[42]**

| Hazard | Frequency | Area Affected / union council | Severity / Force | Year |
|---|---|---|---|---|
| **Floods** | Monsoon | Entire district | Medium | 2010,2011, 2012 |
| **Heavy Rains** | Monsoon | Whole district | Medium | 2010,2011, 2012 |
| **Epidemics** | Seasonal | Entire district | Low | Every year |
| **Earthquakes** | Rare | Whole district | Low | 2013 |
| **Transport accidents** | Often | Entire district | Low | Throughout year |

### *11.1.1* Floods

The Indus River Basin is the most vulnerable region of flood hazard in Pakistan .The mountainous region of north and west are often affected by flash floods while the broad flood plains of Indus plains and low lying deltaic region are affected by river flood. River floods in the summer season are common phenomena in the Indus River Basin.

Tando Muhammad Khan District is one of the newly created districts of Sindh. It was hit by 2010 and 2011 rains/floods. The relative severity of floods was ranked as medium in district TM Khan. River Indus, after receiving water from 5 of its tributary rivers, causes floods in the northern and southern parts of Sindh

[42] Sindh Contingency Plan 2012

province. The upper region of Sindh Province comprises of the districts of Jacobabad, Shikarpur, Kashmore, Larkana and Kamber Shahdadkot on the right bank of River Indus and Ghotki, Sukkur, Khairpur, Naushahro Feroze and Shaheed Benazirabad on the left bank of River Indus. These districts on the right and left banks of River Indus are prone to severe threat when River Indus is in high flood. The districts in the lower Sindh are prone to riverine flooding include Dadu, Jamshoro and Thatta on the right bank of River Indus and Tando Muhammad Khan, Matiari and Hyderabad. The length of River Indus along the province is 750 kms long.

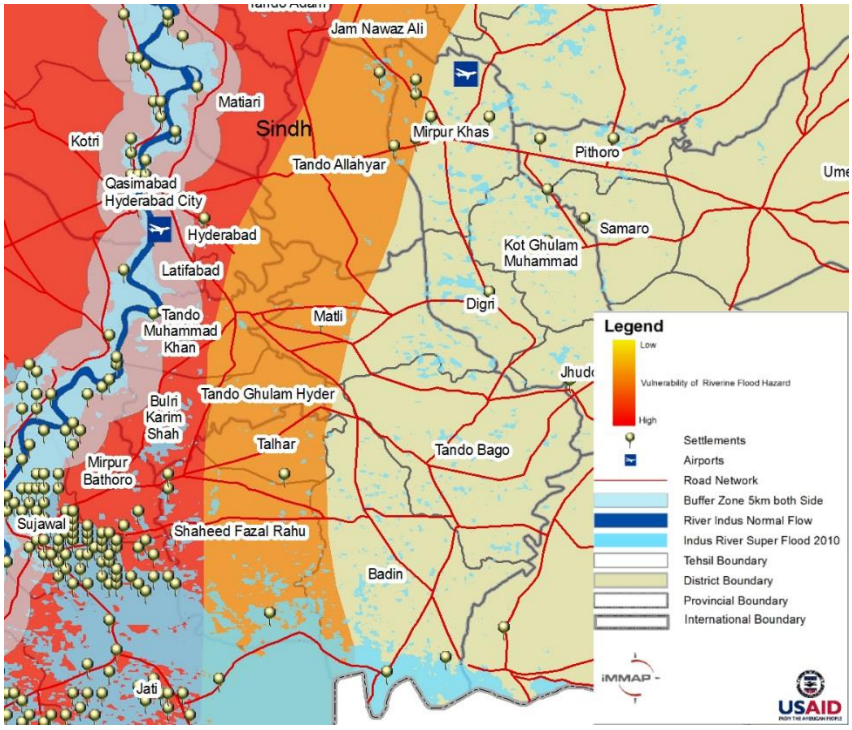



*Figure 11:1: Flood Hazard Map of Tando Muhammad Khan (September 2012)*

The floods of 2011 had devastating effect on this district as all the 16 union councils were affected in 3 talukas. All the sources of livelihood were destroyed for the population, particularly for those whose livelihood sources were mainly dependent on agriculture and related industries. Out of a total population of 605,821, 96% of the population (585,411 was affected). Within the affected population, 59% male and 41% female population were affected. 72,935 houses were damaged out of which 47,582 were partially damaged and 25,353 were destroyed[43]. A total 141,712 acres of area was sown out of which 78,038 acres (55%) was damaged.

[43] Summary of Losses/Damages due to Floods 2011, PDMA, Government of Sindh

### *11.1.2* Impact of 2012 Floods

The severity of floods 2012 was less as compared to the floods 2011. The geographical location of this district makes it vulnerable to water inundation. Nonetheless, a significant proportion of crop area was damaged

- **Food Security Situation**

  Through the destruction of roads, transport and market infrastructure, the floods had a significant negative impact on the commodity market. As a result, the functioning capacity of markets (transporters, processors, wholesalers and retailers) has been decreased with upward movement of transaction costs and shortage of food commodities. This phenomenon hinders the socio-economic access of food in the district[44].

  The losses to crops and livestock along with the poor functioning capacity of the market have significantly reduced the expected income of the population of this district. Thus, the floods and rains affected people of the district Tando Muhammad Khan have to face a number of key challenges to recover their livelihood, agriculture and livestock; directly affecting the food security situation. So, this district may not be categorized as food secure because of the vulnerable situation of the population. All the social indicators show the higher level of poverty and deprivation in this district with large household size, poor literacy level, higher mortality rate and poor level of infrastructure with poor access to education and health facilities.

- **Epidemics**

  During the flood of 2011, all 3 talukas of District Tando Muhammad Khan were affected. Large number of houses were damaged, and many people were left homeless and forced to live under open skies. In such situation, epidemics are common. Commonly spread diseases are:

  - Water-borne disease: Diarrheal disease, typhoid fever, Hepatitis A and E, and parasitic diseases
  - Vector-borne diseases: Malaria, Dengue and Dengue Hemorrhagic Fever
  - Air-borne diseases: Measles, Acute respiratory infection
  - Zoonotic diseases: Crimean Congo Hemorrhagic Fever (CCHF)

  The main causes of the epidemic were poor drainage system and unavailability of sanitary facility[45].

[44] Arif, et al (2010), "The 2010 Flood and Poverty in Pakistan: A Preliminary District-level Analysis", Pakistan Institute of Development Economics Islamabad, Background Paper for Conference on the " The Environments of the Poor", 24-26 Nov. 2010, New Delhi
[45] World Health Organization (WHO) report: http://www.who.int/hac/crises/pak/pakistan_health_cluster_sitrep_13september2011.pdf?

- **Health**

In 2011 floods, total 31 BHU's were identified in district, out of which 7 had been completely destroyed. The same had been reported for RHC's, where one out of four RHC found destroyed by flood water. During this situation, the Agha Khan Health Services Pakistan (AKHSP) provided health facilities support to affected Union Councils of The District.
An organization named as HANDS accommodated 16 union council of district with Antenatal, Post Natal and regular health services to affected local communities.

The fact cannot be denied that women, children and elderly people needed immediate health emergency response support. During this flood season, due to still standing water birth of species like mosquitoes and flies further aggravated the risk situation through diseases like malaria in the district. Poor hygiene, outdated sanitation system and unhealthy water supply also contributed in offering poor health condition to communities hit by rain.

- **Education**

In 2011 flood season, from total number of 1,056 schools, 71 for Boys and 61 for Girls were found destroyed by flood water. Out of 247 schools, including 182 for Boys and 65 for Girls were partially found damaged. And, 187 safe schools locations were used as camps for IDPs.

While keeping in view the loss to education sector caused by floods. A cluster based planning approach for the establishment of temporary learning centers comprising 318 TLC's had been establish to continue the process of education for those affected by flood. The formation of said cluster also helped to re-construct 247 partly damaged schools.

In addition to this planning proposal, a provision of Transitional School Structure (TSS) to 71 destroyed schools were also applied as a planning strategy to save education sector of the district. A proposal for psychological support training of 636 teachers through learning and preservation of 795 School Management Committees for school management was also proposed.

Due to lack of funding only 200 TLCs were established, whereas 10,456 children were facilitated with education facilities, out of them 4,252 were girls. Only 361 teachers including 33 female teachers were trained.

- **Livestock**

Beside loss to natural resources, crops, agricultural lands and human life and activities, livestock's life is always endangered by droughts. Thus, alternate arrangements for emergency response facilities like nutritious fodder, vaccines and livestock sanctuaries must be established to prevent the migration or demise of livestock during droughts. The responsibility to implement such measures falls upon the Livestock Department. As the fodder depletes, livestock are fed on dry grass, leading to a host of digestive problems such as diarrhea, toxemia and metabolic disorders; compromising their immune systems and affecting milk production. This adds to the woes of livestock owners, whose total income generation dependency is upon production of milk produced by cattle, for the benefit of their families and affordability.

As weak and diseased livestock migrate with their owners to barrage areas, a trend of collapse in livestock prices has also noticed, with a healthy goat that sold at full price, once weakened by drought, normally worth only 35% of its original price.

### 11.2 Public Safety

Public safety is the priorities principal of any governance whether it is Federal, Provincial, Divisional or District.
To spread terror in residents, terrorists mainly focused / target crowded places e.g. educational institutions, stadium, shopping centres, malls, religious centres, institutional setups like press club etc., which are less protected in Sindh especially. Terrorist activities can be performed in any shape but mainly on crowded places.

- **Crowded Places**

  Crowded places will remain an attractive target for terrorists, who have demonstrated that they are likely to target places which are easily accessible, regularly available and which offer the prospect for an impact beyond the loss of life alone (for example serious disruption, or a particular economic/political impact).

- **Responsibilities of National / Provincial / Local Government**

  Police and Local Administration Government have the primary responsibility for preventing, preparing for, responding to, and recovering from terrorist attacks in their jurisdiction.
  The protection and resilience of crowded places—particularly those at an elevated security risk—is a key focus of National / Provincial Police / Local Government Administration. While the owners and operators of crowded places remain responsible for implementing protective security measures, National / Provincial Police / Local Government Administration acknowledge that responsibility for building and sustaining resilience to terrorism is shared between government, owners and operators, and communities.
  National / Provincial Police / Local Government Administration are responsible for providing threat information to owners and operators of crowded places. This includes material developed by National / Provincial Police / Local Government Administration, Law Enforcement Agencies (LEA) etc. Police provide specific information on the local threat context to help owners and operators develop protective security measures.
  Police are also responsible for running and administering Crowded Places Forums. These Forums are the primary means of collective engagement between police and local owners and operators of crowded places, including businesses and local councils. Members of the Crowded Places Forum can share information, guidance, and lessons learned relevant to their local circumstances.

- **Responsibilities of Stakeholders**

  Implementation of protective security measures and reducing the vulnerability of crowded places to terrorist attack was not just a job for the Government (Federal / Provincial / Division / District) and the police alone. To be most effective, this work requires engagement from a range of local partners, including local authorities and businesses, in order to identify vulnerable sites and prioritize work to reduce those vulnerabilities.

- **Identification of Land uses for Potential Terrorists Attack**

  Consultant identified different land uses in Dadu which are potential crowd pulling places.

**Table 11-2 : Potential Terrorists Threat**

| S. No | Landuse | Terrorist Threat |
|---|---|---|
| 1 | Education | Secondary Schools/College/ University |
| 2 | Health | BHU/Hospitals/Medical Collages |
| 3 | Commercial | CBD/Mandi/Shopping Mall |
| 4 | Religious | Eid Gah / Shrines/Minority Religious Places/Imam Barghas |
| 5 | Government Offices | District Court/DCO Office/SSP Office/District Jail/Police Head Quarter/LEA |
| 6 | Recreational | Tourism Places |
| 7 | Transportation | Bus Stop/Railway Station/Airport |

- **Existing Situation**

  Concerned authorities have not come up with any plan for terrorist's activities / attack to reduce potential threats, incident management, crisis management, business / life continuity and recovery phases.

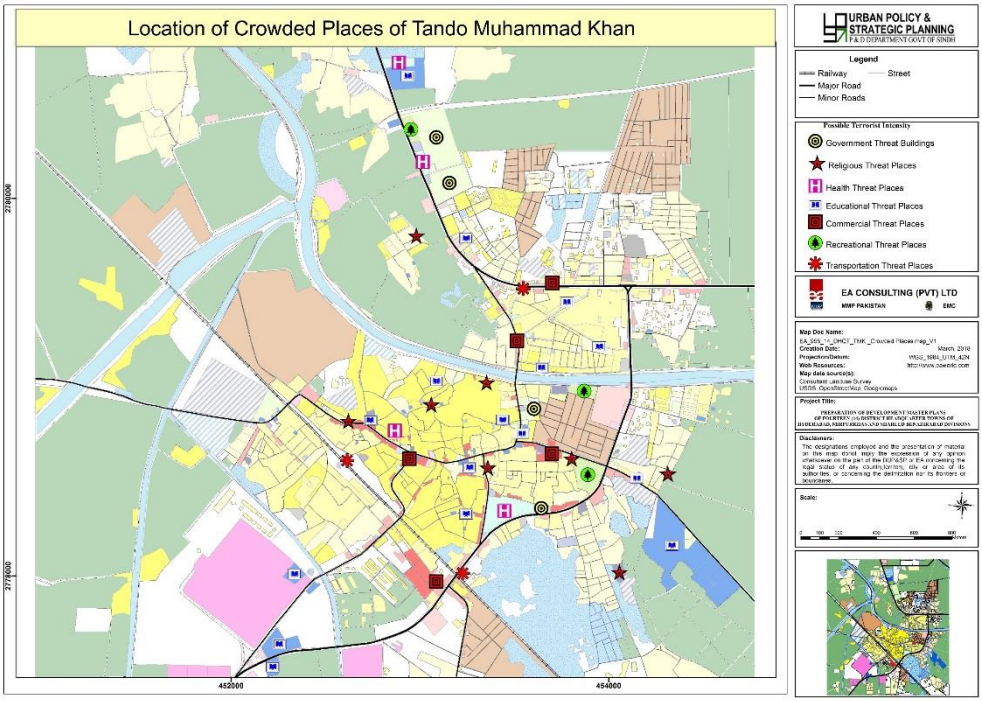



*Figure 11:2 Crowded Places of DHQ Town Tando Muhammad Khan*

- **Possible Terrorist Intensity Places of DHQ Town Dadu**

  Consultants identified some possible terrorist Intensity places of DHQ Town Tando Muhammad Khan on the basis of Crowd and most visiting places by the residents of DHQ Town Tando Muhammad Khan, the places are classified according to the given table above.

- **Proposed Strategy to Counter Potential Threat Measures**

  Proposed Strategy for Protecting Crowded places from Terrorism is based on strong, trusted partnerships between all levels of government and those responsible for crowded places. It aims to make crowded places as resilient as possible to terrorist attacks while preserving our use and enjoyment of these places. A nationally consistent approach will help achieve this objective in an effective and efficient manner.

  The Strategy involves four core elements which provide a structure for building a consistent national approach to protecting crowded places that can be applied flexibly.

  i. **Building Stronger Partnerships**
  ii. **Enabling Better Information Sharing and Guidance**
  iii. **Implementing Effective Protection Security**
  iv. **Increasing Resilience**

**i. Building Stronger Partnerships**

Protecting crowded places from terrorism is not just a job for governments, it is a responsibility shared by the private sector and the community. The success of this Strategy rests on sustainable and strong partnerships between all governments and owners and operators of crowded places, including businesses and local governments.

Trusted relationships between governments and owners and operators of crowded places are fundamental to the effective implementation of this Strategy. The Crowded Places Partnership sets out a range of mechanisms to support this engagement, but none of these replace the ability for all police and intelligence agencies to engage directly with owners and operators when required.

**ii. Enabling Better Information Sharing and Guidance**

Protecting crowded places from terrorism in an evolving threat environment requires trusted and routine information sharing and guidance between all governments, industry sectors, business, and communities.
It is a key responsibility of government to ensure those who own and operate crowded places have access to high quality threat information.

The flow of information between governments and those responsible for crowded places is not one-way. Owners and operators should be willing to share information, advice, and lessons they have learned with governments and their peers. Building a strong and inclusive security culture is a responsibility shared by all.

### iii. Implementing Effective Protection Security

Implementing protective security measures can be a complex process which, if done incorrectly, can be costly and ineffective. Owners and operators have a responsibility to undertake a risk assessment and/or vulnerability analysis of their crowded place, implement the appropriate mitigations, monitor them for effectiveness (including through audits), and review them at appropriate junctures.

### iv. Guidance

Before owners and operators make decisions about protective security measures they must first understand how attractive their location may be for a terrorist to attack.

Crowded places encompass a significant range of different locations, venues and businesses. They differ substantially in size and have different levels of risk to manage.

### v. Layered Security

The goal of layered security is to reduce the likelihood of a successful terrorist attack on a crowded place by building multiple layers of redundancy into a site's security architecture.

Layered security describes the practice of securing a site by applying multiple layers of complementary protective security measures.

The following represents some examples of protective security measures that can be used within each layer. Some security measure can strengthen multiple layers. For example, the effective use of security officers can help to delay, detect, deter, respond to, and recover from an attack.

**Deterring** a potential terrorist attack can involve the presence of obvious physical and electronic target hardening measures, including:

- Fencing indicating demarcation;
- Perimeter security lighting;
- Warning signs and notices;
- High visibility security patrols;
- CCTV cameras;
- Perimeter vehicle security barriers.

**Detecting** a potential terrorist attack can occur through visual detection and alert systems, including:

- CCTV cameras;
- Electronic intruder detection systems;
- Reporting of suspicious behaviour by security officers, staff, or members of the public;
- Vehicle screening and searching;
- Canine explosive trace detection;

- Screening—x-ray machines, metal detectors, explosive trace detection, and bag inspections.

**Delaying** a potential terrorist attack can occur through physical counter-measures and other approaches including:

- Security fences;
- Environmental barriers including water features, natural topography, and vegetation;
- Vehicle security barriers and measures to slow the speed of vehicles;
- Pedestrian and vehicle access control points;
- Trained staff interventions;
- Rapid security officer response.

**Responding** to a potential terrorist attack requires a timely and coordinated security response throughout a crowded place's area of control. Important elements of response include:

- Security staff who can respond quickly and possess the requisite training, competence and equipment to deal with or limit the impact of threats to the location;
- Reliable emergency communication systems throughout the location;
- Comprehensive security plans that are understood by all staff and security personnel, regularly exercised, and compatible with local emergency services plans.

**Cost and Proportionality**

Security measures can be resource intensive, costly and, if not correctly managed and communicated, can alienate staff and the public and significantly disrupt the day-to-day operations of a crowded place. This is why expert specialist advice is essential and why careful consideration and planning is required before implementing any protective security measures. The following principles should underpin all decision-making:

- It is not possible to protect everything, so owners and operators must **prioritise** the highest risk areas of a crowded place;
- All protective security measures should be **proportionate** to the level and type of threat;
- Security is more **cost effective** when incorporated into the design phase of a crowded place.

**Reputation**

The success of governments and businesses rests on building and maintaining a good professional reputation. Reputation is prone to serious and permanent damage if owners and operators of crowded places give a less than robust, responsible professional priority to protecting people against attack. Being security minded and better prepared could not only deter an attack, it reassures customers and staff that those responsible for crowded places are taking security issues seriously.

**Recovery**

Recovery from a terrorist attack is the process of rebuilding, restoring and rehabilitating affected individuals, communities, and physical assets. This process usually begins once an incident has been resolved, continues until disruptions have been rectified, demands on services have returned to normal levels, and the needs of those affected have been met.

**Increasing Resilience**

Even the most the most robust and thorough protective security plan may not stop a terrorist attack on a crowded place from occurring or succeeding. But what well-considered and tested protective security does is reduce both the likelihood of a terrorist attack occurring and the consequences of such an attack.

Resilient crowded places can do more to prevent a terrorist attack, can reduce the damage caused by an attack, and can recover more quickly after an attack has occurred. Building a strong security culture is central to developing resilience to terrorism and other types of criminal activity.

Other elements of building an effective security culture can include:

- Ensuring that security is a permanent feature of executive decision making and agendas;
- Requiring senior management to demonstrate personal commitment to and compliance with security values and standards;
- Understanding commercial, reputational and legal risk that could result from inadequate protective security measures being in place to prevent or mitigate a terrorist attack;
- Providing staff with clear, succinct and jargon-free guidance about security standards and procedures;
- Promoting good security practice to both staff and visitors by making use of internal communication systems, posters, message boards and newsletters;
- Adopting effective and lawful staff screening processes during recruitment;
- Providing staff training in security practices;
- Exercising all staff in security scenarios;
- Self-initiated security penetration and breach testing;
- Sharing information with staff about security breaches;

Encouraging and rewarding staff for identifying and reporting security vulnerabilities.

## 11.3 Issues and Problems

- Low levels of risk awareness and knowledge.
- Development not “risk conscious” and DRR not yet effectively integrated.
- Insufficient DRR capacity at all levels of society.
- The involvement of the private sector in DRR is as of yet negligible.
- Riverine Flood
- Food Security Problem

### 11.4 Policy Guidelines[46]

- Provide training and awareness courses to district, municipal and local authority personals dealing with management of hazard prone areas
- Develop public awareness materials (e.g. posters, brochures, booklets, videos).
- Update media about its role in disaster risk management process and how awareness through media can be broadcasted to local community
- Arrange and conduct need assessments of damages / losses.
- Ensure application of proper mechanism for evacuation and relocation of affected community to safer places.
- Establish Relief Camps with necessary arrangements.
- Initiate relief and rescue activities in their respective areas with the help of all stakeholders which also include provision of shelter, food, medicines etc. to the affected communities as well as to IDPs who are settled in makeshift Relief camps
- Arrange coordination meetings with health units.
- Mobilize entire health network functioning in the district for situation analysis and need assessments.
- Arrange mobile teams / Mobile Medicine Units for pre-medication of affected communities in all near and remote areas.
- Delegate responsibilities for regular inspection and maintenance of irrigation channels and drains.
- Coordinate and communicate with DDMA.
- Identify and strengthen the vulnerable points in the banks of all canals and drains running through the district.
- DRM plans and initiatives need to be based upon assessments that identify the nature and degree of vulnerability or risk (including the identification of particularly vulnerable groups), that allow prioritizing problems or geographical areas on a rational basis and that inform the design of appropriate and technically sound DRM interventions.
- DRM initiatives need to build upon existing community organizations and relevant coping mechanisms to be sustainable.
- Clearly defined division of roles and responsibilities between different layers of government.

### 11.5 Strategic Development

The aim of the policy is to advocate an approach to disaster management that focuses on reducing risks – the probability of losing one's life or health, assets and livelihoods.

### 11.6 Long Term Plan

- **There is a need to have clear arrangements that allow the system to switch into** emergency mode and mobilize necessary resources in a timely and effective manner.

[46] National Disaster Risk Reduction Policy 2013

- There is need to clarify mutual roles and responsibilities (horizontal and vertical) and coordination arrangements in an updated, multi-hazard national response plan that is based upon current legislation.
- The DSM, PPHI shall also be responsible for providing medical cover to the IDPs in the catchment area of BHUs assigned to them particularly, and will perform their due role in supplementing the overall medical cover provided by the District Health Department.
- National risk assessment would identify highly vulnerable districts and be complemented by higher resolution work at local level to diagnose the underlying causes of risk, explore concrete risk reduction options and inform development planning and prioritization exercises and/ or disaster preparedness planning.
- DRR needs to address and involve local level actors in high-risk communities to be effective and produce sustainable results.
- There is need to clarify mutual roles and responsibilities (horizontal and vertical) and coordination arrangements in an updated, multi-hazard national response plan that is based upon current legislation.

## 11.7 Short Term Plan

Some of the objectives in this aspect includes:

- Develop coordination mechanism with PMD for ascertaining flood discharge.
- Develop mechanism for regulation of water discharge into canals, distributaries and drains before onset of monsoon season.
- Develop monitoring mechanism for inspection of embankments, weak parts of drains, IPs (inspection parts) and NIPs (Non-Inspection Parts) of all irrigation channels.
- Provide necessary medical facilities at relief camps.
- Close coordination and communication with DDMA.
- Depending on the calamity, the D.H.O will declare emergency at all medical points/health facilities.
- Detail of medical/paramedical staff at all points requiring medical health cover during any disaster.

## 11.8 Priority Projects

- There is a need to set criteria for the identification and declaration of “disaster affected” areas. Disaster declarations may temporarily restrict individual rights (such as property rights or mobility).
- DRM strategies and initiatives need to be based upon clear assessments of disaster risks i.e. a quantitative and qualitative understanding of the underlying causes and vulnerabilities, geographical distribution of vulnerability and hazards , the probability of hazard occurrence and predicted losses.
- Vigilance of canals / drains round the clock.
- Closure of canals at the heads as soon as possible in case of any breach or heavy downpour, etc.
- Ensure smooth flow of water, plugging up of breaches, if any, in the shortest possible time.
- Prompt dewatering of stagnant water from affected and low lying areas of the district.

- The Executive Engineers, HESCO Division shall ensure uninterrupted supply of electricity particularly to municipal services such as pumping stations for draining out rain water from the low lying and slum areas. Shall make arrangements for immediate removal/repair of fallen live wires to avoid any untoward incident of electrocution
- Arrange and provide adequate stock of medicines and medical supplies including Anti-Snake Venoms (ASVs) and Anti-Rabbi Venoms (ARVs), blood plasma, Saline Water, and other medical fluids for victims.
- Arrange medical teams for providing medical cover to the IDPs settled in any relief camp.
- Fumigate the affected areas and areas at risks of spread of any of epidemic disease.
- Ensure that all ambulances are in working order and road worthy conditions.
- Ensure vacant possession of all schools buildings at the time of emergency for setting up relief camps.
- Ensure sanitation and cleanliness as well as clean drinking water facilities wherever possible at all school buildings declared as relief camps through by binding down their concerned Headmasters.

# 12. CLIMATE CHANGE EMERGENCY CONTINGENCY PLAN

- **District Level Plan**

Tando Muhammad Khan district is prone to canal flooding and floods caused by heavy rainfall.

- **Broad `Contours of the Plan**
  - Early warning of approaching weather system will be provided by Pakistan Meteorological Department (PMD) and communicated to the District Disaster Management Authority (DDMA). DDMA is expected to translate weather forecast and flood warnings into usable early warning for vulnerable communities and ensure its timely dissemination to all concerned.
  - In case, there is continuous rise in major canal water level the people residing near major canals will be evacuated to safer places.
  - Threatened population will be evacuated by DDMA.
  - DDMA would be responsible for provision of search and rescue, medical and emergency responses.
  - Camps will be established at pre-selected sites by DDMA.
  - DDMA would be responsible for effective and transparent relief distribution including relief provided by Provincial Disaster Management Authority (PDMA), National Disaster Management Authority (NDMA) and other Humanitarian Agencies.
  - All stakeholders would take necessary actions to facilitate early recovery and rehabilitation of affected population.
  - In case the district falls short of meeting the humanitarian needs, PDMA will assist by making available the required stocks. In case when disaster exceeds capacities of the provincial government, NDMA will be requested to make available the additional stocks from national reserves, prepositioned across the country.
  - When required, Armed Forces may be requested for assistance by PDMA Sindh at any stage, particularly for rescue, evacuation and emergency relief phases. Thus, the DDMA will have to submit the request to PDMA for assistance of armed forces in aid of civil administration.
  - Special requirements of Aviation / Naval support by any agency will be coordinated by PDMA.
  - Resources of Government Departments and Agencies such as, Pakistan Red Crescent Society and domestic philanthropy may be requisitioned, if the intensity of the situation so entails for an effective response.

- **Early Warning**

### 12.1 Pakistan Meteorological Department

- Pakistan Meteorological Department (PMD) has a broad mandate of supporting agro-based economic activities, air and maritime traffic safety, disaster mitigation efforts and disseminating weather forecast to numerous end users. PMD will ensure the following during monsoon season:
- Inform public on the weather forecast and issue warning in case of potential threat like Rainfall.
- Collect rain data on a regular basis, consolidate and share it with all concerned.
- Disseminate flood information to the NDMA/PDMA on a daily basis during flood season.
- Share weather forecasts and early warning information with NDMA, F/G/S PDMAs, and the media on a regular basis in the monsoon period.
- Coordinate with FFC, WAPDA, PCIW, FFD, and SUPARCO in the Monsoon period to generate flood warning where wanted.

**I. <u>Flood Forecasting Division (FFD)</u>**

- FFD is an affiliated organization of PMD. It disseminates flood early warning and river flow updates to relevant National, Provincial and District Governments and National Response Agencies, especially in the context of Monsoon Season.

**II. <u>Pakistan Space and Upper Atmosphere Research Commission (SUPARCO)</u>**

- SUPARCO deploys its satellite imagery capacities for disaster impact mitigation and for early warning of disaster occurrence and trends monitoring. SUPARCO will play the following role during monsoon season:
- Provide remote sensing and satellite maps before and during disasters in order to show their impact.
- Provide remote sensing and satellite maps for hazard risk zones to enable relevant agencies to take measures for minimizing damage to population and property.
- Assist post-disaster damage assessment.

**III. <u>District Disaster Management Authority (DDMA) Response</u>**

- DDMAs shall activate District Emergency Operation Centers (DEOCs)
- In the event of a disaster, organize emergency response through the District Emergency Operation Center (DEOC)
- Setup early warning mechanisms and dissemination of proper information to public, prepare district level response, plans and guidelines, establish stockpiles of relief and rescue material; provide information to PDMA on different aspects of Disaster Management.
- Inform/update PDMA regarding the overall situation.
- Organize evacuation on priority basis.

- Conduct initial and subsequent assessment of disaster affected areas and determine the extent of loss and damage.
- Collect information on damage status and promptly plan for the resources requirement for relief operation and share it with the PDMA.
- Provide food, drinking water, medical supplies and NFIs to the affected population
- Preferably, set up tent cities / relief camps on open land and provide relief to the affectees in camps.
- Coordinate with PDMAs to deploy resources for emergency response.
- Mobilize community volunteer groups and civil defense for emergency operations.
- Forward timely situation reports (SITREP) on daily basis to PDMA for its timely dissemination to concerned quarters.
- Ensure registration of all relocated population in the camps and overall affected population on gender-segregated basis.
- Prioritize vulnerable segments of society in their relief operations.
- Facilitate early return of relocated population and help in restoring their livelihoods.

### 12.2 Health Department

**I. <u>Pre-Disaster</u>**

- Provide specific information required regarding precautions for epidemics
- Establish a health mobile team in district & town headquarter hospital
- Setup an Information Center to collect and share information amongst relevant stakeholders.
- Collaboration with relevant organizations/partner NGOs.
- Stocking of life saving drugs and vaccines.

**II. <u>During Disaster</u>**

- Providing emergency treatment to the affected
- Provision of First-aid & water testing kits, chloramines and anti-snake venom serum & other emergency support
- Deployment of mobile medical teams & health staff
- Collaboration with all relevant stakeholders

**III. <u>Post Disaster</u>**

- Establishment of medical camps, vaccination, ensuring safe food & water in camps
- Conduct impact assessment on health, intervene to stop outbreak of diseases
- Rehabilitation of health infrastructure

### 12.3 Education Department

**I. Pre-Disaster**

- Providing the necessary information, training to teachers & students regarding disasters with tips to save their families & themselves during disaster.
- In collaboration with Civil Defense and Boy Scouts / Girl Guides Association and gear up the volunteer's force.
- Educate students about Healthcare Precautions

**II. During Disaster**

- Mobilize the human resources for intervention during disaster
- Arrangement for evacuees to setup relief & temporary shelter camps
- Deployment of volunteers for camp management & emergency support

**III. Post-Disaster**

- Assessment of damages & needs of affected educational institutes
- Rehabilitation of affected educational institutes
- Continuing education of children at camps and helping them to recover from shock by providing toys etc.

### 12.4 Agriculture Department

**I. Pre-Disaster**

- Assessment of high risk prone areas and estimation of possible damage
- Create community Seed Bank at UC level
- Regular surveillance of Irrigation water supplies
- Close coordination with Meteorological Department & other stakeholders for weather information.
- Testing, functioning and pre-positioning the available machinery.

**II. During Disaster**

- Immediate mass awareness and update of situation
- Arrangements for relief & temporary shelter camps in canal rest houses
- Vigilance for protection of agriculture crops.
- Immediate activation of machinery and equipment.

**III. Post-Disaster**

- Assessment of damages & needs of affected crop area and submit to DDMA
- Assistance in repair & rehabilitation of Irrigation Systems.
- Timely compensation to affected farmers
- Mass awareness campaigns regarding epidemics & diseases to crops
- Inform the affected population regarding the land use and crop management on damaged/devastated areas.

### 12.5 Livestock and Fisheries Department

**I. Pre-Disaster**

- Estimation of possible damage
- Mass awareness regarding precautions
- Close coordination with agriculture, irrigation, meteorological department and other stakeholders.
- Vaccination of livestock.
- Stocking of fodder and vaccines.

**II. During Disaster**

- Update local communities of ongoing situation.
- Provide livestock vaccination
- Arrangements for relief and transportation of livestock.
- Provision of fodder for livestock in affected area.

**III. Post-Disaster**

- Assessment and submission of damages and need of affected livestock to DDMA
- Timely compensation to affected livestock owners
- Mass awareness campaign regarding epidemics & diseases to livestock

### 12.6 Planning and Development Department

**I. Pre-Disaster**

- Gathering statistical data regarding possible damages and recovery needs from all relevant departments
- Plan and identify potential resources
- Facilitation to other department in planning

**II. Post-Disaster**

- Gathering statistical data regarding actual damaged and recovery needs from all relevant departments
- Plan and Identify potential resources
- Facilitate other departments in planning and execution of rehabilitation in cost effective manner
- Coordinate with all line departments

### 12.7 Revenue Department

**I. Pre-Disaster**

- Assessment of high risk prone areas and estimation of possible damage and needs for recovery.
- Arrangement of financial resources.
- Identification of high grounds for establishment of tent cities.

**II. During Disaster**

- Establish relief distribution centers/camps and accept relief donation/relief support
- Timely release of funds to DDMA.

**III. Post-Disaster**

- Assessment of damages to industrial/business, crops and livestock and settlement of applicable taxes accordingly.
- Support DDMA in conduct of authentic damage assessment and compensation need.

### 12.8 Police Department

**I. Pre-Disaster**

- Information dissemination through "15 helpline service" to local residents
- Deploying and giving security cover to government agencies, which are working/preparing for the monsoon season in areas where law and order is not good.

**II. During Disaster**

- Providing easy access and security to rescue and relief teams.
- Maintain law and order and divert traffic on alternative safe routes as and when necessary.
- Maintaining law and order and provide security to relief stockpiles and camps.

**III. Post-Disaster**

- Ensure security to workers of NGOs/INGOs
- Provide security in unsafe areas
- Facilitating institutions/NGOs/INGOs, which focus on rehabilitation activities

### 12.9 Civil Defense

**I. Pre-Disaster**

- Information sharing regarding technical and personnel expertise with DDMA.
- Conduct training for volunteers in first aid & other activities
- Effectively train & mobilize volunteers and initiate mass awareness regarding necessary first aid rescue activities

**II. During Disaster**

- Deployment of volunteers at the disposal of DDMA for Rescue, Evacuation and initiated basic first aid.
- Communicate to DEOC any additional resources required for performing rescue and evacuation activities
- Taking precautionary measures to stop fire incidents in camps and perform firefighting in emergency.
- Management of relief camps where required.

**III. Post-Disaster**

- Identify gaps and make plan to overcome weaknesses
- Assisting District Administration and other Line Departments in Rehabilitation works

### 12.10 Civil Society And Private Sector Response[47]

The response of civil society organizations and the private sector to floods should be rapid and extensive. Local NGOs, will work extensively with the Government to provide emergency relief support provisions which include ration packs, water purification kits and tablets, shelter items (including tents, blankets and mosquito nets), sanitation kits and hygiene supplies, doctors and medical supplies, mobile and basic health care units especially for women and children. A particular focus will be placed on healthcare services to avoid the spread of water- borne infections and other disease and to provide basic health care services. Media on their part will cover the event extensively and play a significant role in raising awareness and mobilizing local and international resources for the disaster. Individuals and organizations from the private sector, both from Pakistan and the global community will contribute significantly to the flood relief effort alongside the government and donor community.

[47] Government of Sindh Rehabilitation Department Provincial Disaster Management Authority, 2012. Sindh Provincial Monsoon/Floods Contingency Plan, Karachi: Government of Sindh

### 12.11 Scouts

**I. Pre-Disaster**

- Nominate the scouts, which can be trained to handle flood emergencies
- Training will be imparted in the scouts regarding boat handling and first response to the affected during the emergency.

**II. During Disaster**

- Trained scouts will be deployed/placed at the disposal of Deputy Commissioner
- The scouts will perform the duties as per training and will report to respective Deputy Commissioner

**III. Post-Disaster**

- The trained scouts would continue to impart the training in other scouts and volunteers in the district.

### 12.12 Standard Operating Procedures (Sops)

- The Deputy Commissioner shall keep close liaison with all departments like Local Government, Health, Agriculture, Civil Defense, Irrigation, Works & Services, Education & Literacy, Police & other Law Enforcement Agencies. Meetings in this regard are to be held on regular basis with concerned departments and minutes are to be shared with DDMA.
- If there is likelihood of heavy rains, flood emergency would be declared in the District and all government functionaries and NGO's would be kept on high alert.
- Control rooms would be established at District and Taluka level in the offices of the Deputy Commissioner, Assistant Commissioner, Qanoongo (Revenue) and all other line departments during the emergency. These control rooms shall function round the clock.
- The Executive Engineer Irrigation will establish round the clock control room in his/her office for making liaison with all concerned & activate contingency plan of the department. They shall identify the vulnerable points of the irrigation canals and intimate DDMA. Executive Engineer will be in touch with DDMA and the Meteorological Department and inform the concerned agencies about any development emergency. He/She will make special arrangements for watching and patrolling of vulnerable points.
- Immediate arrangements for necessary machinery, sand bags and other material to be used for strengthening of embankments of canals and plugging breach shall be ensured and availability of communication network must be made at all vulnerable points.
- The Executive Engineer Irrigation shall ensure regular, timely and proper de-silting of all canals, distributaries, drains, sub-drains and submit a certificate to his/her higher authorities with an information copy to DDMA.

- The Deputy Commissioner shall ensure activation of Central District Control Room and already established control rooms at each Qanoongo (Revenue) Offices round the clock, under the supervision of Assistant Commissioner concerned. They shall also ensure preparedness at proposed relief camps and ensure immediate evacuation of people residing in low-lying areas to safer place / relief camps, if required. He/She shall also make immediate arrangements for the availability of sufficient quantity of relief material like food, blankets, tents, plastic sheets etc.
- The Deputy Commissioner shall constitute Supervisory Committee for relief works at district level.
- The Deputy Commissioner must further ensure that special attention is given to disabled people, women and children and extra ordinary measures are taken for such purpose.
- The Deputy Commissioner shall nominate the Assistant Commissioner as focal person to coordinate with the Taluka and Town level local council for drainage of accumulated rainwater.
- The Assistant Commissioner shall be focal person in Taluka for the entire operations of rescue and relief. He/She must ensure the respective arrangements for tractor trolleys and labor in coordination with Civil Defence, Boy Scouts Association and Police Department if needed and mobilize the village staff in the pre-and-post emergency work. He/She shall also ensure proper distribution of relief material among the actual needy persons.
- The Executive Engineer Irrigation Department shall ensure availability of bulldozers, excavators and earthmoving machines in sufficient quantity and in proper working condition in case of emergency.
- The Director Agriculture shall arrange for protection of standing crops from damages and diseases that may be caused from the stagnant rainwater in the fields. He/She shall manage required machinery from mechanical wing and must have the inventory of such machinery and equipment.
- The Deputy District Officer Livestock and his/her staff shall ensure safety of livestock from flood diseases and losses and Veterinary Officer shall ensure regular and timely vaccination of cattle in the district. They shall make all necessary arrangements for fodder for the livestock to be shifted from marooned areas.
- The Deputy Controller, Civil Defense should ensure the enrolment of volunteers as early as possible in order to avoid any chaotic situation during emergency. He/She will continuously remain updated of weather forecast reports and with meteorological departments and will arrange for warnings in emergency through sirens, loudspeakers and media at Taluka and town level. He/She shall ensure presence of the volunteers and scouts for rain relief and rescue activities in case of any emergency.
- The Deputy Director Food shall ensure availability of sufficient stock of wheat and other grains and shall coordinate with Deputy Commissioner for supply of food grains from local

food grain dealers in case of need. He/She will also ensure that no stocks of government wheat, placed at depots, are damaged due to water accumulation, fire or rioting.

- The Divisional Engineer Telephone should ensure full function ability of telephones all over the district and provide assistance to all departments on demand at the time of need.
- Continuous supply of gas and proper safety of gas lines in the district must be ensured. Immediate repair work should be performed in case of any damage to the gas lines.
- The Deputy Commissioner shall ensure mobilization of the NGO's and business community in the rescue and relief activities in case of emergency and shall depute volunteers on different emergency tasks.
- The Regional Director Information shall keep close liaison with all control rooms of the district to provide correct and exact information to media regarding emergency. He/She shall also arrange briefings about the latest situation in case of emergency.
- The Red Crescent Society and other welfare associations and NGO's of the district shall provide food packets and other required material to the affected persons in relief camps in case of emergency.
- Proper arrangement for lifting of trees fallen due to heavy rain and gusty winds from the main roads shall be made by the Executive Engineer Provincial Highways department.
- The in charge Utility Store Corporation shall ensure the availability of sufficient stock of edible items in case of need.
- The Revenue Department shall also conduct the survey of any loss of life, houses, cattle, standing crops and other infrastructure after the disaster. In the event of the highest degree of emergency, Pakistan Army may be requested to help the district administration in rescue and relief operations.

## 12.13 Implementation and Monitoring

### *12.13.1* Indicators

#### I. Quantitative Indicators

OECD (2002) defines an indicator as a ''quantitative or qualitative factor or variable that provides a simple and reliable means to measure achievement, to reflect the changes connected to an intervention, or to help assess the performance of a development actor.'' Quantitative indicators are numerical representations of complex phenomenon. Quantitative indicators can be useful in determining the level of achievement at all stages of a resilience project and can even be used to measure the strength of resilience characteristics, though this is better attained by using qualitative indicators[48].

[48] Brown, C., Shaker, R. R. & Das, R., 2018. A review of approaches for monitoring and evaluation of urban climate resilience initiatives. Environment, Development and Sustainability, 20(1), pp. 23-40

### II. Qualitative Indicators

Qualitative indicators evaluate the quality of a plan using subjective data (relying on people instead of instruments). Many qualitative indicators use a 1-5 scoring system, however, this is not the only way; Sovacool (2012) points out that indicators could ''rely on a simple scoring technique of 'positive,' 'negative,' or 'neutral,' as in a given metric can worsen, improve, or stay the same over time.'

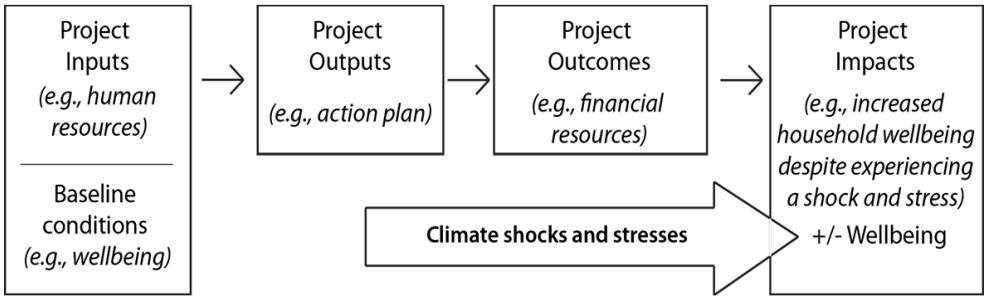



Figure 12:1: Four phases of a resilience initiative, and the timing of baseline and post-shock Measurements of wellbeing (Brown, et al., 2018)

These qualitative values can be used to create baselines and/or to indicate that a particular resilience impact/outcome has been achieved. The challenge with a qualitative indicator that uses a scale from 1-5 is that the scale should be created based on criteria that is fair and well informed.

### III. Process Indicators

There are many processes that underlie resilience planning and action, and process indicators outline the extent to which these processes have been undertaken. Moser and Boykoff (2013) write that given the challenges (e.g., attribution) in adaptation and resilience measurement, ''tracking and evaluating the adaptation process—with all of its individual components (e.g., assessment, planning, stakeholder engagement, decision-making, implementation, institutionalization, monitoring, and social learning)—becomes at least as important as the questions of success in outcomes''.

An example of a process indicator is the level of participatory involvement in resilience decision making. If one's definition of resilience encompasses participatory involvement, then the extent to which this has been applied can be used as a process indicator. This can be assessed qualitatively (on a scale of 1-5) or quantitatively (number of stakeholder types represented).

### IV. Impact Indicators

Determining the impact of resilience initiatives is a bit difficult, as these impacts are often difficult to interpret or understand and can often not be measured until after a disaster, or at least until the slower onset effects of climate change have started to occur (e.g. sea level rise). One approach

could be to assess the process and outcome indicators and inferring from the results that climate change resilience has been reasonably ensured.

Wellbeing and financial losses after a disaster are the two most important climate resilience indicators that can help to assess the success of climate change resilience initiatives. By evaluating these indicators, evaluators can gain an insight to the effect of climate change resilience initiatives on the community. By assessing these two indicators, a city can determine whether it has the adaptive capacity to remain resilient in the face of shocks and stresses resulting from climate change.

## V. Identified Indicators[49]

**Collection of Data to Perform Vulnerability Assessments to Floods**

- Number of exposure and socio-economic datasets on current exposure to floods at district level.
- Geographic coverage of all datasets (% of all exposed areas).
- Number of reports detailing data collection and summarizing information.
- Number of policy and technical documents based on datasets and modeling scenarios.

**Building Technical Capacity to Generate Vulnerability Assessments to Floods**

- Number of technical staff trained to acquire competence in computer modelling techniques and able to perform Vulnerability Analysis (VA).
- Average staff performance on end-of-training comprehension tests.
- Proportion of ministries using datasets to generate vulnerability analysis or proportion of sectors covered by analysis at district level.
- Number of policy and technical documents incorporating results from VA's.
- Proportion of government investment/program documents using results from VA's as a priority-setting or screening tool.

**Institutional Framework and Mechanisms to Support Adaptation and Adaptive Capacity**

- Number of laws and regulations created or amended to clarify land and carbon property rights.
- Existence of a dispute resolution mechanism.
- Number of materials (presentations, briefs, papers) developed for legal literacy programs.
- Number of people participating in legal literacy programs.

[49] McCarthy, N., Winters, P., Linares, A. M. & Essam, T., 2012. Indicators to Assess the Effectiveness of Climate Change Projects, Washington DC: The Inter-American Development Bank

- Number of individuals and community groups participating in Reducing emissions from deforestation and forest degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries (REDD+) financed projects.
- Average number of days and money spent in REDD+ project preparation.
- Total value of REDD+ projects and value per participant.
- Percentage reduction in production variability from forest-based activities and/or farm production at the forest margins.
- Number of early warning and health hazards dissemination outlets, by type of outlet (e.g. radio, newspaper, and website), geographic coverage, and level of disaggregation of system information (e.g. district-specific).
- Percentage languages used in dissemination materials of total number of languages spoken in district.
- Number of extension materials containing climate change-relevant materials.
- Percentage change in government budget allocations towards climate change information dissemination.
- Percentage reduction in property damage.
- Percentage reduction in mortality and in disease prevalence for diseases related to weather patterns (e.g. malaria, dengue).

**Investment in Projects that Directly Support Adaptation and Improve Adaptive Capacity**

- Percentage increase in the number of seed varieties developed, documented and made available in the market.
- Documentation of seed varieties and their characteristics.
- Documentation of procedures and partnerships created to transfer seeds either directly to farmers or to market traders.
- Percentage increase in number of seed varieties available in rural markets.
- Number of climate resistant seed varieties available in the market and percentage increase in use of climate resilient seed varieties.
- Percentage crop yield improvement in years of climate extremes.
- Percentage greater performance in average crop yields.
- Percentage decrease in proportion of rural and urban populations malnourished.
- Number of energy facilities built or retrofitted to withstand greater range of climate shocks.
- Percentage of total capacity built or retrofitted by type of facility and by “threat” level identified in vulnerability analysis.

- Percentage decrease in monetary damages to energy facilities due to climate extremes (adjusted for degree, or extent, of climate shock).
- Percentage decrease in customers losing access to energy due to climate shock-induced power failures.

### *12.13.2* Responsibility of Plan Implementation

**Table 12-1: Authorities Responsible for Implementation of Plan**

| S# | Department | Designation |
|---|---|---|
| 1 | **Administration** | District Commissioner |
| | | Assistant District Commissioner-I |
| | | Assistant District Commissioner-II |
| 2 | **Irrigation** | District Irrigation Officer |
| 3 | **Agriculture** | District Agriculture Officer |
| 4 | **Health** | District Health Officer |
| 5 | **Education** | District Education Officer |
| 6 | **Social Welfare** | District Officer |
| 7 | **Livestock** | District Officer |

**Monitoring and Evaluation**[50]

There are three ways to monitor and evaluate climate change adaptation and resilience:

- Measuring against project objectives
- Measuring against baselines
- Measuring against emerging understanding of good adaptation measure

**a) Measuring against Baselines**

Baseline comparisons can be used to monitor and evaluate the effectiveness of climate resilience initiatives. During this process, an initial measurement is taken (e.g., number of civic organization per 10,000 people). This measurement is then taken at different stages of the project to measure the effectiveness of strategies used to improve that particular indicator. This approach could be applied to resilience characteristics (e.g. flexibility). In order to do this, a more qualitative assessment (subjective scoring from 1 to 5) could be employed to create a baseline value.

**b) Measuring against Definitions**

Relatively straightforward definitions exist for climate adaptation, but in the context of resilience – with its emphasis on system level interaction and inherent qualities – this approach can prove to be much more difficult. How you define resilience is a key determinant in how the monitoring and

[50] Brown, C., Shaker, R. R. & Das, R., 2018. A review of approaches for monitoring and evaluation of urban climate resilience initiatives. Environment, Development and Sustainability, 20(1), pp. 23-40

evaluation approach will be adopted. For example, if resilience is defined as a decrease in post-disaster recovery time, specific indicators will be evaluated which would not be useful when concerned with the resilience characteristics with cities.

**c) Measuring against Project Objectives**

As mentioned above, the objectives of a resilience program differ depending on the way resilience is defined and also at which phase of the project the assessment is being made. Alexander et al. (2016) define process as the ''inputs, throughput and outputs of the decision-making process,'' outcomes as ''the implementation of the outputs from the decision-making process'' and impact as ''the resulting effect of the decision-making process and outcome''. Similarly, Spearman and McGray (2011) use the following sequence: inputs, initiatives, outputs, outcomes, and impacts. Monitoring and evaluation can take place at each of these temporal locations (i.e., process, outcome, impact). Many people also advocate that monitoring and evaluation be carried out throughout the duration of the project rather than just at the beginning and the end of the project.

**d) Key Principles of Monitoring, Evaluation and Reporting System[51]**

**i. Use of Mixed Methods**

The monitoring and reporting system combines quantitative and qualitative methods to collect and analyze data, and generate knowledge and lessons in implementing the plan.

**ii. Ownership**

District focal points for each sector (mentioned in the table above) are responsible for collecting, aggregating and submitting their reports annually to the District Administrative Unit.

**iii. Stakeholder Engagement**

Empowering stakeholders and ensuring their active contribution to the monitoring and reporting process is a key feature of the monitoring and evaluation system. The monitoring and reporting system is rooted in the desire to maintain a programmatic approach in the implementation of the investment plans through projects and programs. It aims to engage the stakeholder groups, including government institutions at national, sub-national and local levels, as well as civil society, local communities and the private sector, in discussing progress with the implementation of the monitoring plan. The monitoring and reporting process will also be used to share lessons learned and discuss the challenges encountered with a view to identify feasible solutions.

**iv. Learning by Doing**

Monitoring and reporting is an iterative learning process. It is expected that the quality of monitoring will improve over time as the authorities gain experience.

[51] Williams, A., 2016. Options for Results Monitoring and Evaluation for Resilience-Building Operations, Washington DC: World Bank Group

# 13. URBAN LAND MANAGEMENT

## 13.1 Introduction

Urban areas throughout the developing world are experiencing a problem in the supply of adequate and affordable serviced land to meet the housing needs of their rapidly expanding urban populations. As a result, low income groups who are mostly denied access to land due to shortfall in supply are forced to either seek for residential land through illegal means or to crowd into existing low income settlements, creating slum conditions. In Sindh, the shortfall in land supply arises not from the lack of virgin land but partly from the lack of resources, capacity to service the lands and land ownership by landlords and make them ripe for development and also partly from the use of ineffective and inappropriate land and landuse policies and practices.

"Land management" is defined as an activity on the ground, using appropriate technologies in the respective land use systems. It is known by different names in different parts of the world; basically all are land management tools. In Pakistan land management is not being practiced till yet because of non-absence of policies / framework. Strong land owner opposition to forcible land acquisition, combined with extremely limited fiscal capacity has left the urban local bodies (ULBs) with very few options to develop well-planned and serviced urban land. Land pooling and reconstitution (LPR) is a tool that addresses both these issues by allowing the land owners to share the gain in the land value post provision of infrastructure and services. In lieu, the land owners pay betterment charges and contribute a part of their land to fund the infrastructure and services.

## 13.2 Goals

As most of towns in Sindh strive to become centers of global production, trade and development, they are increasingly concerned with improving their attractiveness for foreign direct investment and employment generation. For example, towns must have efficient spatial structures, adequate infrastructure and urban services, affordable housing and healthy environments. Effective urban land management is required to promote urban regeneration and development of new industrial and commercial districts, investments to upgrade and expand critical infrastructure systems, programs to enhance and protect the environment, and initiatives to upgrade social overhead capital (housing, education, healthcare).

## 13.3 Objectives

To implement these initiatives for Tando Muhammad Khan, there is a need to develop urban land management strategies to provide land for industrial and commercial development, to facilitate the formation of public-private partnerships, and to finance the provision of infrastructure and social overhead capital investments. Unfortunately, in many cities around the world such strategies do not exist and foreign investment is either stifled or, if it does take place, causes significant adverse side effects.

Cities and towns are crucial to the economic well-being of Sindh. For this, it is imperative that its cities and towns are transformed and pressures of new growth are dealt with so that they are more liveable, efficient,

and environmentally sustainable. Only then will the rapid pace of economic growth that Sindh is undergoing be sustained and the targets of environmental sustainability achieved. To manage the transformation of Sindh's cities and towns and effectively manage new growth requires effective urban planning protocols, processes, and institutions underpinned by effective legislation. To effectively manage the new growth implies that the agricultural land at the periphery of the cities and towns or smaller settlements that are not yet "urban" is transformed to be made suitable for urban or non-agricultural uses. This essentially means that the irregular landholdings and plots will have to be given regular shapes; they must be ordered; each plot must be given access; infrastructure services such as water supply and drainage must be provided; land must be appropriated for providing roads, parks, social amenities, and low-income housing, development controls must be prescribed to result in a good quality-built form and levy development or betterment charges to offset the cost of developing the physical and social infrastructure. But most importantly, all of this must happen in a timely and such manner that it is acceptable to the "landowners" to avoid conflict in the growth management process.

### 13.4 Urban Land Management in Tando Muhammad Khan

Due to absence of provincial policy / framework for utilizing Urban Land especially in District headquarter towns, planners / development authorities have not carefully assessed the land use and transportation impacts of foreign investment. Due to non-existence / less effectiveness of Development authority mechanism, schemes / projects in private sector faces low exposure due to non-availability of basic facilities and monitoring mechanism by approval authority. As a result traffic congestion and infrastructure problems with the water supply and sewerage treatment are mounting.

Getting access to land for factories and commercial facilities is problematic, particularly in agricultural rich fertile land. Decades of inefficient allocation of land for industrial uses have literally blighted / dis-courage agricultural activities in the region. Unfortunately, a lack of clarity over land rights, corruption and bureaucratic inertia are impeding redevelopment. To compound matters, land use plans in many transition economy towns have not been planner to reflect the new land use requirements necessary to support post-industrial development.

To effectively exploit the benefits of inward investment flows and to ensure that social and environmental goals are met, the public sector needs to take the lead in planning and formulating urban land management strategies to promote sustainable urban economic development.

### 13.5 Land Pooling and Reconstitution

Simply put, in LPR, a number of small holdings are pooled together, a part of land is taken from each plot for provision of infrastructure and public facilities and the rest returned to the original land owners. It is basically a land management tool and is used all over the world under different names with slight modifications in their working.

### *13.5.1* Land Management Techniques

The strategies available for access to urban land could be through Guided land development for large areas; Land pooling and reconstitution; Land reconstitution / redevelopment; Acquisition for public purpose under the Land Acquisition Act, 1894; Joint Sector Model of land assembly and development; Transferable Development Rights (for built up areas); Saleable FAR and mixed use concept (for regeneration of inner city); Land Pooling and Redistribution Scheme.

#### A. Land Acquisition Act, 1984

In Pakistan, the Land Acquisition Act, 1894 gives the right for Government authorities to acquire parcels of land for the implementation of development projects. The origin of the practice of land acquisition by public entities in Subcontinent goes back to 1824, when the British Government of India instituted regulations to facilitate urban land public acquisition from private owners. In fact, the obligation for owners to give up their land had to find a legitimate justification. The initial reason advanced to acquiring the land against their will was the need for constructing public buildings in Bengal provinces. These regulations enabled the British government to take possession of the land for the construction of roads and canals. From 1850 on, the scope of these laws was extended to other provinces in order to facilitate the operation of further infrastructure projects such as railways.

The Land Acquisition Act was edited in 1894. It harmonized and consolidated previous regulations into one single act, applicable within the whole British India. After Pakistan's independence in 1947, the Pakistan Government started using this act as a tool to purchase land at a lower price than that on the regular market, as it was meant to be used in the public interest. Several amendments have been made on this act, but its procedures have not changed.

#### B. Land readjustment / pooling

Land readjustment / pooling Land re-adjustment is a process whereby a public authority assembles numerous small parcels of raw land without paying compensation to the owners. The authority then sub-divides such assembled lands for urban use returning most of the building sites to the original owners in proportion to the value of their land contribution and permitting them the right of alienating such sites. The authority retains a portion of the assembled lands, applying them partly to provide civic amenities such as roads, parks and gardens or schools, and the remainder land for public sale to recover the cost of development. Thus, land re-adjustment acts as tool to achieve unified control over large areas of land and as an instrument of financing public service installations in the process of planned urban growth.

#### C. Guided Urban Development

The concept of Guided Urban Development (GUD) emerged in response to ad hoc, uncontrolled urban development with no regard to infrastructure services. It also aims to secure a limited availability of urban land for economically weaker sections. GUD has been practicing in India and developing world. The objectives of the scheme are as follows:

- Ensure provision of serviced plots for low income families at affordable prices (approximately 75% of total plots to be reserved for EWS / LIG); and
- Provide incentives to the land owner / private developer to participate in the provision of low income shelter by guaranteeing fair return on investments (profit of 20-30%).

**D. City Survey**

City survey is very important to manage land records for city. City survey will help to resolve present hassle in property transactions besides impeding planning & development. It will also help to resolve several issues i.e. Verification of ownership & Land grabbing issues respectively. Therefore it is suggested to conduct city survey & deal as separate project for Tando Muhammad Khan.

### 13.6 SWOT Analysis and Need Assessment

| Strength | Weakness | Weakness | Threats |
|---|---|---|---|
| **GOVERNANCE** | | | |
| **Planning Actors** | | | |
| 1. Politicians<br>2. Existence of Local government<br>3. Public Health Engineering Department | 1. Lack of co-ordination among departments.<br>2. Weak technical support of government departments.<br>3. Weak financial base of departments.<br>4. Absence of development authority.<br>5. Shortage of technical staff, town planners, urban designer and policy makers at SMC, Regional Office of SBCA)<br>6. Overlapping of administrative functions<br>7. Need based ad-hoc planning system (day-to-day basis) | 1. Strengthen the institutions, responsible for planning and execution<br>2. Immediate preparation of overall urban development strategy<br>3. Detailed land use zoning plan<br>4. Sectoral development plans<br>5. Detailed subject plans to regulate with density development.<br>6. Enhancing the role of local government on sustainable basis. | 1. Inaccurate funding in development projects.<br>2. Wastage of local resources<br>3. Infrastructure development of poor quality, non-standard infrastructure.<br>4. Failure to provide technical support on issues required innovation.<br>5. May give birth to unwilling political interference and hidden interests based on nepotism and discrimination. |

| Strength | Weakness | Weakness | Threats |
|---|---|---|---|
| **Coordination of Public Agencies / Department** | | | |
| 1. Town Committee / Taluka Municipal Administration<br>2. Politicians in charge<br>3. Participation of Sindh Building Control Authority (SBCA) | 1. Weak co-ordination mechanism.<br>2. Lack of information sharing between line departments. | 1. Preparation of local co-ordination standard procedures through policy frameworks.<br>2. Organizing events to make strong coordination between different departments. | 1. Week coordination may give birth to poor governance.<br>2. Political interference |
| **Local Council** | | | |
| 1. Availability of Town Committee. | 1. Not actively pursuing the stated objectives. | 1. With awareness and training of councilors the local councils can be more effective.<br>2. Workshops and meetings can enhance the coordination as well as clear the vision about development perspectives. | 1. Confusion and chaos in the local development affairs at present until local bodies are established. |
| **Financial Resources** | | | |
| 1. Institution and system are in place.<br>2. Regular provincial grants available for development project.<br>3. Programme based medium-term donors funding. | 1. The council does not affectively generate funds.<br>2. Less efforts offer by local councils for revenue generation through available local resources.<br>3. High dependency on provincial grant.<br>4. Lacking capacity in collection and | 1. Self-sustainable financial system needs to be effectively introduced.<br>2. Development of self-reliance and suitable financial model.<br>3. Resource generation through PPP. | 1. Poor maintenance of infrastructure relating utility services.<br>2. Political pressure and financial leakages.<br>3. Lacking M&E and implementation of strict accountability measures during audits. |

| Strength | Weakness | Weakness | Threats |
|---|---|---|---|
| | financial management.<br>5. Very low capacity for capital investment in development projects. | 4. Exploitation of local potentials for resource generation.<br>5. To curb mismanagement and corruption. | |

**Proposed Public Administration Landuse for Tando Muhammad Khan Town**

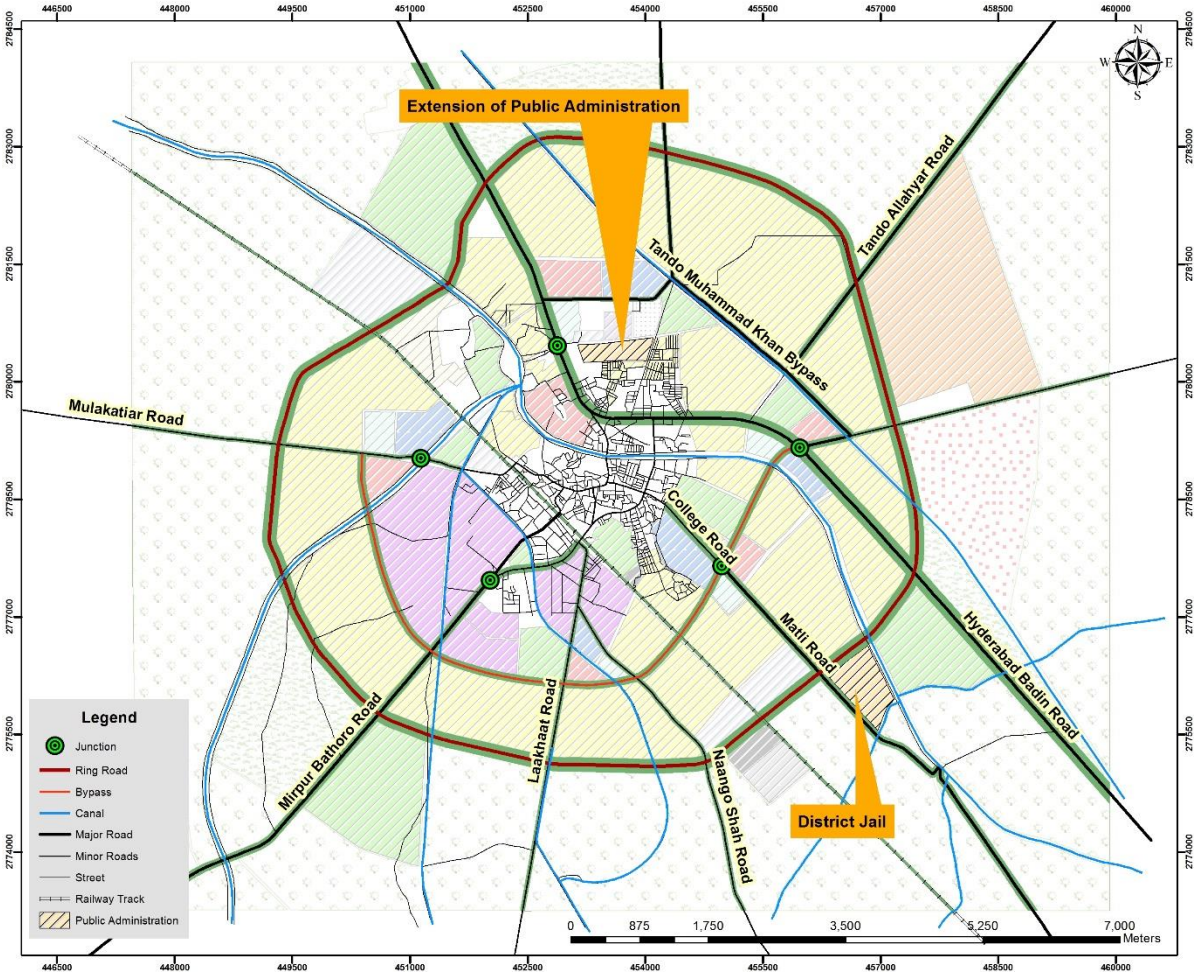



Figure 13-1: Future Administrative Proposal of Tando Muhammad Khans

# 14. IMPLEMENTATION STRATEGY

This part of the report aims to provide an implementation framework for various development proposals recommended in 'Strategic Development Plan' to drive future growth of Tando Mohammad khan DHQ town up to 2037, under the present governance framework of Government of Sindh.

## 14.1 Process of Implementation

The implementation of development plan is basically the process of prioritizing, phasing, coordinating, budgeting, scheduling, monitoring and making adjustments. There are number of management systems and charting procedures available to help a city manager to control this process. Issues that must be addressed in this regard are:

- Determine priorities within and among the sub plans
- Determine the phasing or sequence of activities among the sub plans.
- Address timeframes and budget availability
- Creating master schedule of activities with a progressive cost table so that the program can be appropriately expanded or contracted to meet implementation contingencies and budget fluctuations.
- Assign the various activities to be undertaken by qualified managers.
- Establish a timely monitoring and report system to keep the city officials and the public informed of progress and activities.

## 14.2 Implementation Agency

The office of the Deputy Commissioner and in case of Local Bodies/Local Government, the Chairman of district council and Mayor of metropolitan city will be the key implementation agency to execute Strategic Development Plan Tando Muhammad Khan 2037.

The Government of Sindh would take responsibility of implementing various development proposals by utilizing its maximum resources and by engaging various public offices of government of Sindh, established in Tando Mohammad khan. The concerned agency must ensure that the overall process must go after following themes of implementation process.

*a)* ***The overreaching theme of the implementation of Strategic Development Plan Tando Mohammad khan is:***

- Consultation with stakeholders during implementation at all levels.
- Decentralize decision making to the greatest extent possible.
- Promote transparency and accountability of decision making and implementation enforcement.
- Rationalize impacts where necessary;
- Ensure compensation to affected communities

- Enhance the quality of infrastructure provisions, promote utility services opportunities, and focus facilitating poor segments of society.

*b)* ***The principals that implementation process will follow:***

- The overall implementation process to be carried out in coordination with Town Planning and Urban Development Standards (Frameworks) in which redevelopment will be phased to prioritization;
- The implementation process will be based on updated planning codes and regulations;
- Special consideration will be paid to implement planning standards relating to disaster (Drought) preparedness in all development proposals/projects;
- Facilitate communities, government machinery, and other organizations of community to participate in overall implementation process;
- Educate stakeholders for technical assistance;
- Be comprehensive, coherent, and coordinate to avoid errors through continuous monitoring and evaluation
- Arrange supple of financial resources

### 14.3 Legal Frameworks

Local governance agencies dealing with any development proposal must ensure that all development related activities and their approval consent should be carried out in accordance with urban planning statutory frameworks of government of Pakistan operational at all government level levels. This includes all legal frameworks substantiated through the relevant articles of constitution of Pakistan and the primary act (LAA 1984) governing land acquisition and compensation.

a) ***National Level Policy Frameworks***

The constitution of the Islamic Republic of Pakistan passed on the 10th April 1973 and as modified thereafter, is the supreme law of Pakistan Government. This constitution provides legal cover to all laws and acts, particularly those embedded in chapter-3 pertaining with land acquisition, development and compensation.

*b)* ***State level Statutory Frameworks pertaining to planning and development Control***

On 14th Feb 2011, the government of Sindh notified the extension of the jurisdiction of Karachi Building Control Authority to the whole of Sindh. The five Regions of Sindh Building Control Authority notified by the Government of Sindh are: **Karachi, Hyderabad, Mirpurkhas, Sukkur & Larkana,** having the Head Quarter **Karachi. Thus, any development activity within juridical boundary of these districts must be carried out in accordance with the primary planning instrument ' *Sindh Town Planning and Building Control Regulation'*.**

*c)* ***Local Planning Instruments***

There is variety of regulations dealing with municipal services offences and penalties (Fines) in case of violation have been constituted in Schedule-VI (Section 139) 'Offences under the Act' Part-1 of Local Government Act-2013 (Third Amendment 2016) of Sindh Government.

*In this regulation, various well defined public activity management and control regulations dealing with Public Health Safety, Land use Planning, Development Control, Encroachments, preparedness of safety measures from Natural & manmade disaster, quality of Drinking water, Solid Waste & Waste Water generating though multiple activities, Preservation of Heritage Sites, Open Space management and associated penalties, in case of violation, have been defined in detail.*

*d)* ***Other relevant planning and design standard instruments***

There are varieties of other documents that support assessment of development proposals prior to implementation. e.g. 'National Reference Manual' - Ministry of Housing and works, Environment and Public Affair Division, etc.

If regularization requirements of any of development proposal is beyond the capacity of regularity frameworks mentioned above, the concerned agency dealing with development/implementation process in Tando Muhammad Khan may develop their own regulatory frameworks/ building codec's to regularize the status of development with consent of local/provincial government authorities, if necessary.

### 14.4 Institutional Enhancement

While implementing the Strategic Development Plan "SDP', the respective Provincial and District Government may seek technical assistance from all the line department i.e. DUP&SP, Local Development Authority, Municipal Corporation, secretariat of Commissioner and Deputy Commissioner.

The *'Urban Management Unit*' will mainly consist of urban planners supported by other technical staff; architects, project managers, engineers, finance officers and any other technical staff expert in their relevant fields.

The *'Urban Management Unit'* shall supervise and coordinate respective urban developers involved in development activities, conduct monitory audits, preparer evaluation and impact reports and will report to the head of respective governance agency.

Development authorities will be responsible for implementing new approved town planning and building codes with the assistance of office of head of respective governance agency. The office of district coordinator will be responsible for the overall coordination and monitoring and will provide support for development/redevelopment activity from federal to district level.

The district Urban Management Unit would also facilitate the office of district coordinator/ deputy commission for all development/ implementation related (a) needs identification (b) revision of annual plans (c) coordination (d) financial management and (e) monitoring of all development activities assigned to developers or government departments.

**Proposed Public Administration Landuse for Tando Muhammad Khan Town**

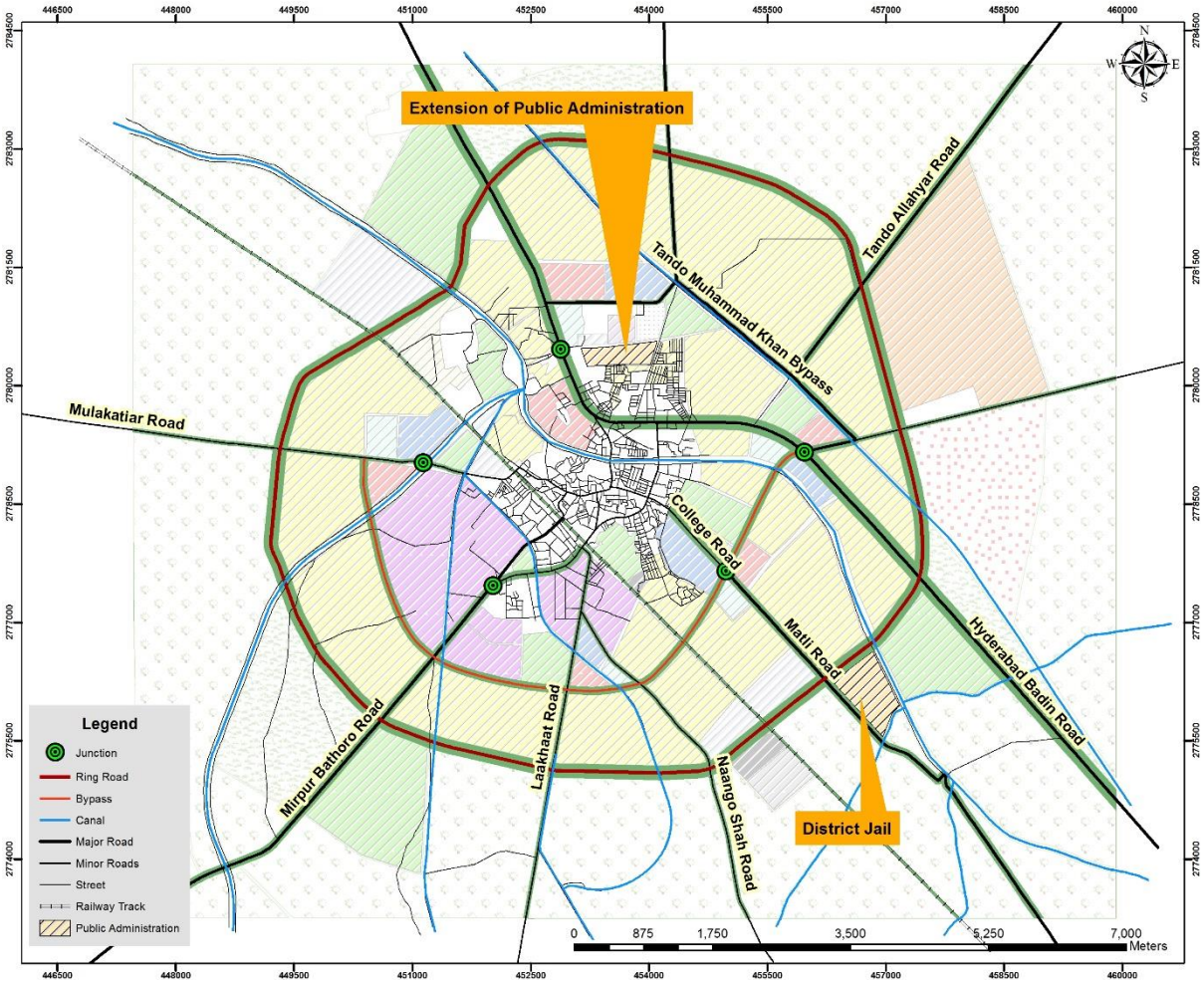



**Figure 14-1: Proposed Landuse of Public Administration for Tando Mohammad khan**

## 14.5 Implementation Schedule

| ***Strategy:*** | **Programs/ Policies** |
|---|---|
| **Balanced Urban Growth** | **1. <u>Land Use Zoning</u>**<br><br>The historical growth of Town shapes up along the canal and Hyderabad-Badin Road. Tando Muhammad Khan was developed as a combination of linear and concentric town with different location of services and use of facilities.<br><br>Mostly town seems to be sprawling in three directions, i.e. North, South-west and South-east direction but the pace is slow.<br><br>The low urban density development is evident starting from different stands in town The agriculture land in the Town fringes is prone to land use change due to enhanced demand for housing and institutional setups.<br><br>In Tando Muhammad Khan, there are possibilities of urban Densification by introducing vertical growth. The Sindh Building & Town Planning Regulations (Building Control Regime) already provide this possibility and may ease the sprawl along fringes in all towns.<br><br>**2. <u>Development Control</u>**<br><br>Tando Muhammad Khan Town is observing fragmentation and is being divided into large parcels bifurcated by Regional interconnected roads and Water canals crossing-by town and can be developed as regional centre of agricultural activities due to its locational advantage in rich irrigation system in lower Sindh.<br><br>Required Amendment in Zoning Bye laws.<br><br>The town is prone to low and inefficient infrastructure as a result of execution of development schemes in town. As the Tando Muhammad Khan development isn't in particular form due to absence of development authority mechanism and political dynamics of land and politics which helps to contain land control regime. The infrastructure in town is continuously under pressure due to un-planned development. |

| | |
|---|---|
| | **3. <u>Transportation</u>**<br>The district is well-connected with other districts through good quality roads<br>Contribution in positive regional and local economic development<br>**<u>Roads</u>**<br>• Need Dualization & Rehabilitation of Existing Roads. |
| **Responsibilities to Plan:**<br>Detailed Urban Design Strategy<br>Development Assessment<br>Impact of property Assessment<br>Environmental Impact Study (EIA,IEE) | **Implementation Responsibilities:**<br><br>Public Sector/ Private developers |
| **Concerned Agencies:**<br><br>P & D Department Government of Sindh/ District Government/ Line Departments of local Government / Private Developers | **Time of Implementation:**<br><br>Short Term (1 year to 5 Years)<br>Long Term (5 years to 20 Years) |

| | |
|---|---|
| ***Strategy:***<br><br>**Future Transport Sector Development & Improvement** | **Programs/ Policies**<br><br>**<u>(A)Traffic Management Program</u>**<br><br>• Parking restrictions / Charged parking system<br>• Control traffic movement specially cargo Qingqis and Pick-ups<br>• Manage unidirectional traffic flow.<br>• Enforcement of traffic rules<br>• Improved road infrastructure and street furniture<br>• Implementation of traffic bylaws<br><br>**<u>(C ) Congestion Reduction in Core Urban /CBD Area</u>**<br><br>• Designated stands for qingqi / rickshaws<br>• Specified spaces for charged parking system<br>• Alternate route for loading and unloading vehicles<br>• Unidirectional traffic flow pattern<br>• Removal of encroachments from major distributors<br>• Development of infrastructure for pedestrian movement in old precinct. |

| | |
|---|---|
| **Responsibilities to Plan**<br><br>• Enforcement of encroachment and road space improvement byelaws<br>• Traffic corridors detailed study<br>• Encroachment Removal & Relocation Study<br>• On Street & Off Street Parking Feasibility Study<br>• Beautification plan | **Implementation Responsibilities**<br><br>International Development and Fund Supporting Agencies/Public Sector/ Private developers |
| **Concerned Agencies**<br>Provincial Works & Services Department Government of Sindh./ District Highways Department/ Local Municipal Government/District Government/ Private Developers Line Departments of local Government. | **Time of Implementation**<br><br>Short Term (1 year to 5 Years)<br>Long Term (5 years to 20 Years) |
| ***Strategy:***<br><br>**Water Supply System Improvement** | **Programs/ Policies**<br><br>• In the long term, piped water supply system for 100% population by 2037<br>• Installation of localize network in the planned housing schemes first and gradually cover the whole population in five year plans.<br>• Reuse of treated effluent<br>• Implementation of Tariff System for utilities through Water Metering (first for water usage above marginal consumption then in long run for all users).<br>• Construction / Rehabilitation Of Water Supply Network<br>• Improvement of Water Intake Works |
| **Responsibilities to Plan**<br><br>• Need Assessment/Demand & Supply Study<br>• Separate Master Plan for water supply and infrastructure development plan | **Implementation Responsibilities**<br>Public Sector/ Private developers |
| **Concerned Agencies**<br><br>Provincial / Local Government/ Public Health Engineering Department | **Time of Implementation**<br><br>Short Term (1 year to 5 Years)<br>Long Term (above 5 years ) |

| ***Strategy:***<br><br>**Drainage & Sewerage System Improvement** | **Programs/ Policies**<br><br>• Improvement and reconstruction of existing Combined system of sewerage and drainage (Phase-wise approach of replacing open drains with covered sewers of PE pipes).<br>• Provision of wastewater treatment plant. |
|---|---|
| **Responsibilities to Plan**<br><br>• Need Assessment/Demand & Supply Study<br>• New Master Plan for Drainage & Sewerage services improvement. | **Implementation Responsibilities**<br><br>Public sector / Private developers |
| **Concerned Agencies**<br><br>Provincial / Local Government/ Public Health Engineering Department Municipality (MC) | **Time of Implementation**<br><br>Short Term (1 year to 5 Years) |

| ***Strategy:***<br><br>**Solid Waste Disposal System Improvement** | **Programs/ Policies**<br>• Immediate designation of walled Landfill *Site* with special attention for hospital waste disposal.<br>• Collection and disposal of solid waste through specialized waste management companies. |
|---|---|
| **Responsibilities to Plan**<br><br>• Disposal Generation Assessment Study<br>• New Master Plan for Solid Waste Disposal System improvement. | **Implementation Responsibilities**<br><br>Public / Private Sector |
| **Concerned Agencies**<br><br>Provincial / Local Government/ Public Health Engineering Department Municipality (MC)/ Sindh Solid Waste Management Company SSWMB | **Time of Implementation**<br><br>Short Term (1 year to 5 Years) |

| ***Strategy:***<br><br>**Improving Efficiency of Municipal Committee's (MC)**<br><br>• Municipal Committee | **Programs/ Policies**<br><br>• Acquire the required additional sanitary workers as per requirement.<br>• Make Municipal Committee self sufficient<br>• Strengthening Municipal Committee's Financial Capacity<br>• In long term introduce 4R Solid Waste Management System (reduce-reuse-recycle-reject) |
|---|---|
| **Responsibilities to Plan**<br><br>• Municipal Committee's Progress Assessment Study | **Implementation Responsibilities**<br><br>Public / Private Sector |
| **Concerned Agencies**<br><br>Provincial / Local Government/ Public Health Engineering Department Municipal Committee (MC) | **Time of Implementation**<br><br>Short Term (1 year to 5 Years) |

| ***Strategy:***<br><br>**Improving Fire Fighting Capacity** | **Programs/ Policies**<br><br>• Establishment of fire-stations to accommodate required number of fire vehicles.<br>• Establish sub-stations at different locations to ensure short response time for the whole city.<br>• Increase service efficiency through number of vehicles, dedicated staff and financial mechanism.<br>• To ensure readiness of all vehicles with ample stocks of POL and spares. |
|---|---|
| **Responsibilities to Plan**<br><br>Assessment on Municipality's firefighting potential | **Implementation Responsibilities**<br><br>Public Sector |
| **Concerned Agencies**<br><br>Tando Muhammad Khan Municipal Committee. | **Time of Implementation**<br><br>Short Term (1 year to 5 Years) |
| ***Strategy:*** | **Programs/ Policies** |

| | |
|---|---|
| **Energy (Gas, Electric Power, Energy Generation through Alternate Resources)** | • Development of alternative energy resources such as wind, solar and bio-gas etc.<br>• To Improve existing infrastructure of WAPDA<br>• Solar street lights project<br>• Energy generation through solar panel system for residential and commercial purpose. |
| **Responsibilities to Plan**<br>• Demand and Assessment of various energy resources.<br>• Feasibility study for solar Park<br>• Rehabilitation of solarized street lights. | **Implementation Responsibilities**<br>Public/ Public Private Partnerships |
| **Concerned Agencies**<br>• SSGC-Sui Southern Gas Company<br>• WAPDA<br>• Developers | **Time of Implementation**<br>Short Term (1 year to 5 Years) |

| | |
|---|---|
| ***Strategy:***<br>**Health Sector**<br>Improve access to healthcare facilities & minimize the long journeys to access basic medical facilities | **Programs/ Policies**<br>• Check and balance to accomplished existing health care projects.<br>• Addition of 1,344 beds to achieve the target of 2 beds per 1000 district population<br>• Hiring of 1,049 doctors and paramedical staff to cater future population.<br>• Installation of incinerators. |
| **Responsibilities to Plan**<br>• Health reforms | **Implementation Responsibilities**<br>Public Sector and Welfare Agencies |
| **Concerned Agencies** | **Time of Implementation** |

| | |
|---|---|
| State Government/District Health Department.<br>Provincial and District Health Department | Short Term (1 year to 5 Years)<br>Long Term (above 5 year) |

| ***Strategy:***<br><br>**Education Sector Strategy** | **Programs/ Policies**<br><br>• Short term plan provision of 919 classrooms at school and college level.<br>• Repairing of school existing buildings with furniture<br>• Training of teaching staff<br>• 8,285 additional classrooms (school and colleges) by 2037 |
|---|---|
| **Responsibilities to Plan**<br><br>• Education Infrastructure Improvement Mater Plan | **Implementation Responsibilities**<br><br>Public Sector |
| **Concerned Agencies**<br><br>Provincial Government/District Education Department. | **Time of Implementation**<br><br>Short Term (1 year to 5 Years)<br>Long Term (more than 5 years) |

| ***Strategy:***<br><br>**Improving Recreation Sector** | **Programs/ Policies**<br><br>• Repairing of existing recreational facilities and completion of under construction work.<br>• Introduce financial mechanism i.e. facility use charges, to generate revenue to make them self-sustaining.<br>• Special arrangement for security, parking and alternate route during religious and cultural activities in the city.<br>• Preservation of Dhandi Mosque, Fateh Bagh Graveyard and Kot Bambhan Thul and Feasibility study for |
|---|---|

| | |
|---|---|
| | establishment of museum and research center near archeological sites<br>• Construct more parks and rehabilitate the available parks to facilitate the people of Tando Mohammad khan MC.<br>• Construction of auditoriums and up-gradations for art councils<br>• Conservation and Preservation of Heritage Sites. |
| **Responsibilities to Plan**<br><br>• Provisions of New Recreation sites | **Implementation Responsibilities**<br><br>Public Sector |
| **Concerned Agencies**<br><br>Provincial Government / Culture, Tourism & Antiquities Department/ Government of Sindh/ District / Local Government / MC | **Time of Implementation**<br><br>Short Term (1 year to 2 Years)<br>Long Term (More than 5 years) |

| ***Strategy:***<br><br>**Disaster Risk Management** | **Programs/ Policies**<br><br>• Engage all stakeholders of entire district in overall disaster rehabilitation process.<br><br>• Recognize the commitment of stakeholders and the need for collaboration across all levels of government, community, industry, commerce, and government owned corporations, private and volunteer organizations and local communities within all aspects of disaster management.<br><br>• Aligned job responsibilities of key stakeholders with job descriptions mentioned in principal guidelines proposed in *Pakistan National Disaster Risk Management Act 2010*, *National Disaster Risk Management Guidelines* and *Disaster Risk Management Plan, Sindh.* |
|---|---|

| | |
|---|---|
| | • Ensure establishment of straight relationships, trust, teamwork, consultative decision-making and shared responsibilities among stakeholders.<br>• Develop disaster risk assessment system through statistical information, risk maps, emerging hazards information and their affects.<br>• Adopt measures of sustainability of local communities by utilizing local resources available to avoid post disaster cataclysms (dearth, theft, spread of epidemic diseases, etc).<br>• Promote economic sustainability after disasters. |
| **Responsibilities to Plan**<br>• Identification of Disaster Prone Areas and Early warning and shelter homes<br>• Development of Community Training and Drill Organization Manual and SOP.<br>• Development Local stakeholders Roles and Responsibility SOP. | **Implementation Responsibilities**<br>Public Sector and National /International Welfare agencies |
| **Concerned Agencies**<br>NDMA/PDMA/ P & D department Gos/ SUPARCO/ Provincial Irrigation Department Gos. / Line departments of local government/District Disaster Management Authority. | **Time of Implementation**<br>Short Term (1 year to 5 Years) |

| **Strategy**<br><br>**Economic Development Plan** | **Programs/ Policies**<br>• Rehabilitation of Infrastructure in existing Small Industrial Estate (roads, street lights, parking for loading/unloading goods vehicles, etc.)<br>• Increase strategic storage through construction of cold storage / Godowns for agro products to cater drought situation.<br>• Provide good incentives near peripheries for shifting / re-location of whole sale markets from the inner city to reduce congestion.<br>• Encourage Local Private Investors by giving them subsidies.<br>• Consider changing trends of crop production through periodically revise Economic Policy Framework (feasible studies for economic potentials)<br>• Ensure measures for security / risk recovery plan for economic zone.<br>• Market and logistics should also be added to enhance trade and commerce.<br>• Livestock and dairy sector needs to encourage and facilitated.<br>• Centralize wholesale markets to create connectivity with regional markets.<br>• Drought measures |
|---|---|
| **Responsibilities to Plan**<br>Feasible studies for economic potentials | **Implementation Responsibilities**<br><br>Public /private developers |
| **Concerned Agencies**<br>Provincial Government/District Government/Local Government / Tando Mohammad Khan Chamber of Commerce and Industries | **Time of Implementation**<br><br>Short Term (1 year to 5 Years)<br>Long Term (5 years to 20 Years) |