**Bill of Quantities**

The Construction of Elobeied International Airport to comply ICAO **4E**

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| ITEM | Description | Unit | Quant. | Rate (SDG) | Amount  (SDG) |
| 1 | 1. **Runway Shoulder**   Provide, and compact a suitable selected natural gravel with CBR≥30% for sub base course as per Design. Each layer should be compacted separately and its thickness not exceeded 15cm. 2.5 % transverse slopes for the runway shoulders should be considered during the construction.  The degree of compaction should not be less than 98%. | 9,000 | m³ |  |  |
|  | **Runway Extension**   1. **Subbase Layer**   Provide, and compact suitable selected natural gravel with CBR≥30% for sub base course as per Design. Each layer should be compacted separately and its thickness not exceeded 15cm. 1.5 % transverse slopes for the runway should be considered during the construction.  The degree of compaction should not be less than 98%. |  |  |  |  |
| 2 | **Runway Extension**   1. **Subbase Layer**   Supply, opt, moisten ,mix, and compact to 100% compaction degree a 20 cm blended base (stabilized) mixture that comprises suitable local natural gravely aggregate, natural wadi coarse sand, and different manufactured crushed stone sizes (19-12 ,12-9, and 5-0 mm) capping the sub base. The mechanical stabilization process can be estimated 60% natural gravel with 40% agents. The processed base blend should comply with .British Standards (B.S.) and its strength ≥ 80% (CBR).  The compaction process in one layer > | 5,400 | m³ |  |  |
| 3 | Spray hot prime coat with1.2 kg/m2 (Iran bitumen project) for all maneuvering area. | 210,000 | m2 |  |  |
| 4 | Supply and apply 7.0 cm compacted hot mix asphalt (HMA) as a binder concrete asphalt course that complying with B.S and SCAA specifications. and SCAA specifications. | 26,460 | Ton |  |  |
| 5 | Supply and spray hot tack coat with 0.7 – 0.9 kg/ m² intensity for the proposed maneuvering area. | 157,500 | m² |  |  |
| 6 | Supply and apply 6 cm Compacted hot mix asphalt (HMA) as an over lay concrete asphalt course that complying with B.S. and SCAA specifications. | 30,240 | Ton |  |  |

1. **Taxi ways**

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| ITEM | Description | Unite | Quant. | Rate (SDG) | Amount  (SDG) |
| 1 | Provide, and compact a suitable selected natural gravel with CBR≥30% for sub base course as per Design. Each layer should be compacted separately and its thickness not exceeded 15cm .1.5 % transverse slopes should be considered during the construction of Runway sub base layers and 2.5 % transverse slopes for the runway shoulders .  The degree of compaction should not be less than 98% | 43,000 | m³ |  |  |
| 2 | Supply, opt, moisten ,mix, and compact to 100% compaction degree a 20 cm blended base (stabilized) mixture that comprises suitable local natural gravely aggregate, natural wadi coarse sand, and different manufactured crushed stone sizes (19-12 ,12-9, and 5-0 mm) capping the sub base. The mechanical stabilization process can be estimated 60% natural gravel with 40% agents. The processed base blend should comply with .British Standards (B.S.) and its strength ≥ 80% (CBR).  The compaction process in one layer > | 12,000 | m³ |  |  |
| 3 | Spray hot prime coat with1.2 kg/m2 for all maneuvering area. | 53,600 | m2 |  |  |
| 4 | Supply and apply 7.0 cm compacted hot mix asphalt (HMA) as a binder concrete asphalt course that complying with B.S and SCAA specifications | 6,270 | ton |  |  |
| 5 | Supply and spray hot tack coat with 0.7 – 0.9 kg/ m² intensity for the proposed maneuvering area. | 37,320 | m² |  |  |
| 6 | Supply and apply 6 cm Compacted hot mix asphalt (HMA) as an over lay concrete asphalt course that complying with B.S. and SCAA specifications. | 7,070 | ton |  |  |

* Taxiway (A) & (B) : 220m X 23m + 10.5m Shoulder each side .
* Taxiway (B) : 400m X 23m + 10.5m shoulder each side
* Parallel Taxiway 600 X 30 m + 7.5 m Shoulder each side ( Phase – 1 )

1. C-**Military Apron:**

**Total Area of Military Apron = 150 m x 300 m (0.35m thickness)**

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| ITEM | Description | Unite | Quant. | Rate (SDG) | Amount  (SDG) |
| 1 | Site Cleaning | m2 | 45,000 |  |  |
| 2 | Excavation (depth = 0.6 m) | m3 | 27,000 |  |  |
| 3 | EARTHWORKS  Providing and placing Sub-base Material of natural Aggregate is required to accommodate wide body aircraft (2lyers of total thickness 40cm) as specified in specification | m3 | 30,000 |  |  |
| 4 | Concrete Apron  Providing and placing machine mixed structural Portland cement concrete mix (1:3:6 ) shall be proportioned to achieve a 28-day flexural strength that meets or exceeds the acceptance criteria contained in specification (minimum flexural strength for airport pavements  ASTM C78)(with steel mesh of Ø6mm 300 mm C/C @The bottom of Concrete Slab 3cm cover). | m3 | 15,750 |  |  |
| 5 | Steel Dowel bar (shall be plain steel bars conforming to (ASTM A615))  of Ø16mm@150mm C/C (at The Middle of Concrete Slab and 700mm length). | Ton | 30 |  |  |
| 6 | Steel mesh of Ø6mm@300 mm C/C (at The bottom of Concrete Slab and 30mm cover). | Ton | 25 |  |  |
| 7 | Joint seal.  Providing and filling The joint seal for the joints in the concrete pavement(25mm x 25mm) shall meet the requirements as specified in specification | m3 | 20 |  |  |
| 8 | Isolation joint filler  Providing and filling Remolded joint filler for isolation joints (320 mm) shall conform to the requirements of (ASTM D1751) | m3 | 280 |  |  |

1. Blast pad: Total Area of & Blast pad = 2(120 m x 45) (0.25m thickness)

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| ITEM | Description | Unite | Quant. | Rate (SDG) | Amount  (SDG) |
| 1 | Site Cleaning | m2 | 10,800 |  |  |
| 2 | Excavation (depth = 0.4 m) | m3 | 4,350 |  |  |
| 3 | EARTHWORKS  Providing and placing Sub-base Material of natural Aggregate is required to accommodate wide body aircraft (2lyers of total thickness 40cm) as specified | m3 | 4,350 |  |  |
| 4 | Concrete Blast pad  Providing and placing machine mixed structural Portland cement concrete mix ( 1:3:6 )  shall be proportioned to achieve a 28-day flexural strength that meets or exceeds the acceptance criteria contained in specification | m3 | 2,700 |  |  |
| 5 | Steel Dowel bar (shall be plain steel bars conforming to (ASTM A615))  of Ø16mm@150mm C/C (at The Middle of Concrete Slab and 700mm length). | Ton | 10 |  |  |
| 6 | Steel mesh of Ø6mm@300 mm C/C (at The bottom of Concrete Slab and 30mm cover). | Ton | 8 |  |  |
| 7 | Joint seal.  Providing and filling The joint seal for the joints in the concrete pavement shall meet the requirements as specified in specification | m3 | 15 |  |  |
| 8 | Isolation joint filler. Providing and filling Remolded joint filler for isolation joints shall conform to the requirements of ASTM D1751 | m3 | 115 |  |  |

**e- Holding Bay:**

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| ITEM | Description | Unite | Quant. | Rate (SDG) | Amount  (SDG) |
| 1 | Site Cleaning | m2 | 9,200 |  |  |
| 2 | Excavation (depth = 0.4m) | m3 | 3,700 |  |  |
| 3 | EARTHWORKS  Providing and placing Sub-base Material of natural Aggregate is required to accommodate wide body aircraft (2lyers of total thickness 40cm) as specified in specification | m3 | 3,700 |  |  |
| 4 | Concrete Holding Bay  Providing and placing machine mixed structural Portland cement concrete mix (1:3:6 ) shall be proportioned to achieve a 28-day flexural strength that meets or exceeds the acceptance criteria contained in (with steel mesh of Ø6mm 150 mm C/C @The bottom of Concrete Slab 3cm cover). | m3 | 3,220 |  |  |
| 5 | Steel Dowel bar (shall be plain steel bars conforming to (ASTM A615))  of Ø16mm@150 mm C/C (at The Middle of Concrete Slab and 700mm length). | Ton | 10 |  |  |
| 6 | Steel mesh of Ø6mm@300 mm C/C (at The bottom of Concrete Slab and 3cm cover). | Ton | 8 |  |  |
| 7 | Joint seal.  Providing and filling The joint seal for the joints in the concrete pavement(25mm x 25mm) shall meet the requirements as specified in specification | m3 | 5 |  |  |
| 8 | Isolation joint filler  Providing and filling Remolded joint filler for isolation joints (320mm) shall conform to the requirements of (ASTM D1751) | m3 | 60 |  |  |

**Total Area = 115 m x 80 (0.35m thickness**)

E- Electrical civil works :

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| --- | --- | --- | --- | --- | --- |
| ITEM | Description | Unite | Quant. | Rate (SDG) | Amount  (SDG) |
| 1 | Excavation (for pipes crossing Runway & Taxiway) | m3 | 415 |  |  |
| 2 | Providing and placing High Pressure pipes of 6 in diameter (crossing the runway). Length =60m (Standard Specification for High-Density Polyethylene (PE) Standard ASTM F2619 / F2619M) | No. | 24 |  |  |
| 3 | Providing and placing High Pressure (HDPE) pipes of 6in diameter (crossing the Taxiway). Length = 51 m (Standard Specification for High-Density Polyethylene (PE) Standard ASTM F2619 / F2619M) | No. | 28 |  |  |
| 4 | Providing and placing Reinforced Concrete Manholes (with shear walls & cover), of Area 0.8m\*0.8 m & 1.0m height | No. | 6 |  |  |
| 5 | Providing and placing Reinforced Concrete Manholes with cover, of Area 0.5m\*0.5 m &0.75m height | No. | 14 |  |  |

**Surface Drainage**

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| --- | --- | --- | --- | --- | --- |
| ITEM | Description | Unite | Quant. | Rate (SDG) | Amount  (SDG) |
|  | Grading & leveling the area of the Airport that specify in specification & Drawings). | m2 | 225,000 |  |  |
|  | Providing and Construct reinforced concrete Culverts as specify in specification crossing taxiways | No. | 3 |  |  |
|  | Excavation & removal of all deposited of open channel of length 4.5 km and cross-section that specify in specification & Drawings). | m3 | 5000 |  |  |

**e : Graded Portion :**

Should be applying for the:

* Runway strip.
* Taxiways strip**.**

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| Amount  SDG | Rate  SDG | Quant | Unit | Description | ITEM |
|  |  | 1,482,925 | m2 | Site Clearance | 1- |
|  |  | 741,460 | m2 | Graded area compacted with selected non-expansive material | 2- |
|  |  |  |  | Sub Total | |

**f : Access Road & Service Roads :**

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| --- | --- | --- | --- | --- | --- |
| Amount  SDG | Rate  SDG | Quant | Unit | Description | ITEM |
|  |  | 270,000 | m2 | Site Clearing | 1. |
|  |  | 94,500 | m3 | Excavation Removal of top soil | 2. |
|  |  | 75,600 | m3 | Provide, and compact a suitable selected natural gravel with CBR≥30% for sub base course as per Design. Each layer should be compacted separately and its thickness not exceeded 15 cm . transverse slopes should be considered during the construction of access road and service roads sub base layers  The degree of compaction should not be less than 95% . | 3. |
|  |  | 12,000 | m3 | Supply, opt, moisten ,mix, and compact to 98% compaction degree a 20 cm suitable local natural gravely aggregate,. The processed base should comply with .British Standards (B.S.) and its strength ≥ 80% (CBR).  The compaction process in one layer > | 4. |
|  |  | 80,000 | m2 | Spray hot prime coat with1.2 kg/m2 for all roads area. | 5. |
|  |  | 9,600 | ton | Supply and apply 5 cm Compacted hot mix asphalt (HMA) as an over lay concrete asphalt course that complying with B.S. and SCAA specifications. | 6. |
|  |  |  |  | Sub Total | |

**Kenana Airport Project**

**Airfield Markings**

**White Paint (1liter/1** m2**)**

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| Amount  SDG | Rate  SDG | Quant | Unit | Description | ITEM |
|  |  | 3600 | m2 | Runway Edge Marking | **1** |
|  |  | 864 | m2 | Runway Threshold Strip | **2** |
|  |  | 71.28 | m2 | Designation Number | **3** |
|  |  | 513 | m2 | Runway Centre line | **4** |
|  |  | **5048.28** |  | Total | |

**Yellow Paint**

(0.025Galon/Meter length)

The thickness of the line = 15 cm

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| Amount  SDG | Rate  SDG | Quant | Unit | Description | ITEM |
|  |  | 2800 | m.l | Taxiway Edge Marking – | **1** |
|  |  | 1300 | m.l | Taxiway Centre line Markings | **2** |
|  |  | 1800 | m.l | Apron Edge Markings – | **3** |
|  |  | 276 | m.l | Holding Position Markings | **4** |
|  |  | 1500 | m.l | Apron Layout | **5** |
|  |  | **7676** |  | Total | |