



1-Jan-36	1-Jul-36	1-Jan-37	1-Jul-37	1-Jan-38	1-Jul-38	1-Jan-39	1-Jul-39	1-Jan-40	1-Jul-40	1-Jan-41	1-Jul-41
30-Jun-36	31-Dec-36	30-Jun-37	31-Dec-37	30-Jun-38	31-Dec-38	30-Jun-39	31-Dec-39	30-Jun-40	31-Dec-40	30-Jun-41	31-Dec-41
2036	2036	2037	2037	2038	2038	2039	2039	2040	2040	2041	2041



1,829	1,847	2,041	2,062	2,245	2,268	2,469	2,493	2,736	2,763	2,998	-
798	806	876	884	968	978	1,064	1,075	1,167	1,179	1,293	-
666	673	736	743	811	819	891	900	982	992	1,084	-
531	536	584	589	643	649	708	715	781	789	859	-
1,515	1,530	1,668	1,685	1,836	1,854	2,022	2,043	2,228	2,250	2,451	-
338	342	373	377	411	415	453	458	499	504	550	-
<b>5,677</b>	<b>5,734</b>	<b>6,278</b>	<b>6,340</b>	<b>6,914</b>	<b>6,982</b>	<b>7,608</b>	<b>7,684</b>	<b>8,393</b>	<b>8,477</b>	<b>9,234</b>	-
142	143	157	159	173	175	190	192	210	212	231	-
142	143	157	159	173	175	190	192	210	212	231	-
<b>5,961</b>	<b>6,021</b>	<b>6,591</b>	<b>6,657</b>	<b>7,259</b>	<b>7,331</b>	<b>7,988</b>	<b>8,068</b>	<b>8,813</b>	<b>8,901</b>	<b>9,696</b>	-



TRUE	FALSE	TRUE	FALSE	TRUE	FALSE	TRUE	FALSE	TRUE	FALSE	TRUE	FALSE
8%	0%	8%	0%	8%	0%	8%	0%	8%	0%	8%	0%
8%	0%	8%	0%	8%	0%	8%	0%	8%	0%	8%	0%
8%	0%	8%	0%	8%	0%	8%	0%	8%	0%	8%	0%
8%	0%	8%	0%	8%	0%	8%	0%	8%	0%	8%	0%
8%	0%	8%	0%	8%	0%	8%	0%	8%	0%	8%	0%
8%	0%	8%	0%	8%	0%	8%	0%	8%	0%	8%	0%

TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	FALSE
------	------	------	------	------	------	------	------	------	------	------	-------

7.36	7.36	7.95	7.95	8.59	8.59	9.28	9.28	10.02	10.02	10.82	-
12.25	12.25	13.23	13.23	14.28	14.28	15.43	15.43	16.66	16.66	17.99	-
17.13	17.13	18.50	18.50	19.98	19.98	21.58	21.58	23.31	23.31	25.17	-
24.46	24.46	26.41	26.41	28.53	28.53	30.81	30.81	33.27	33.27	35.94	-
31.75	31.75	34.29	34.29	37.03	37.03	39.99	39.99	43.19	43.19	46.65	-
39.11	39.11	42.24	42.24	45.62	45.62	49.27	49.27	53.21	53.21	57.45	-



## Debt

Start Date	1-Jan-17	1-Feb-17	1-Mar-17	1-Apr-17	1-May-17	1-Jun-17	1-Jul-17	1-Aug-17	1-Sep-17	1-Oct-17	1-Nov-17	1-Dec-17
End Date	31-Jan-17	28-Feb-17	31-Mar-17	30-Apr-17	31-May-17	30-Jun-17	31-Jul-17	31-Aug-17	30-Sep-17	31-Oct-17	30-Nov-17	31-Dec-17
Year	2017	2017	2017	2017	2017	2017	2017	2017	2017	2017	2017	2017

<b>Total Debt</b>	<b>8,329</b>
<b>Tenor</b>	<b>10</b>
<b>Grace Period</b>	<b>2</b>
<b>3-Month KIBOR</b>	<b>7%</b>
<b>Credit Spread</b>	<b>2.00%</b>
<b>Spread Terms</b>	<b>4</b>

### Debt Breakdown

Repayment	-	-	-	-	-	-	-	-	-	-	-	-
Interest	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total Debt</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>

### Debt Repayment Schedule

Opening Balance	-	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Add: Long Term Debt	(0)	0	0	0	0	(0)	0	(0)	0	(0)	(0)	0
Interest	-	-	-	-	-	-	-	-	-	-	-	-
Less: Repayment	-	-	-	-	-	-	-	-	-	-	-	-
<b>Closing Balance</b>	<b>(0)</b>	<b>(0)</b>	<b>(0)</b>	<b>(0)</b>	<b>(0)</b>	<b>(0)</b>	<b>(0)</b>	<b>(0)</b>	<b>(0)</b>	<b>(0)</b>	<b>(0)</b>	<b>(0)</b>

### Classification of Loan

Long Term Debt	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Current Portion	-	-	-	-	-	-	-	-	-	-	-	-

### Debt Sculpting

Opening Balance	8,329	8,329	8,329	8,329	8,329	8,329	8,329	8,329	8,329	8,329	8,329	8,329
Less: Repayment	-	-	-	-	-	-	-	-	-	-	-	-
<b>Closing Balance</b>	<b>8,329</b>	<b>8,329</b>	<b>8,329</b>	<b>8,329</b>	<b>8,329</b>	<b>8,329</b>	<b>8,329</b>	<b>8,329</b>	<b>8,329</b>	<b>8,329</b>	<b>8,329</b>	<b>8,329</b>

CFADS	-	-	-	-	-	-	-	-	-	-	-	-
DSCR	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
Interest Payments	-	-	-	-	-	-	-	-	-	-	-	-

Repayment	-	-	-	-	-	-	-	-	-	-	-	-
-----------	---	---	---	---	---	---	---	---	---	---	---	---

Default Check	-	-	-	-	-	-	-	-	-	-	-	-
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CONCESSION AGREEMENT OF SWAT EXPRESSWAY

1-Jan-18	1-Feb-18	1-Mar-18	1-Apr-18	1-May-18	1-Jun-18	1-Jul-18	1-Aug-18	1-Sep-18	1-Oct-18	1-Nov-18	1-Dec-18	1-Jan-19	1-Jul-19	1-Jan-20	1-Jul-20
31-Jan-18	28-Feb-18	31-Mar-18	30-Apr-18	31-May-18	30-Jun-18	31-Jul-18	31-Aug-18	30-Sep-18	31-Oct-18	30-Nov-18	31-Dec-18	30-Jun-19	31-Dec-19	30-Jun-20	31-Dec-20
2018	2018	2018	2018	2018	2018	2018	2018	2018	2018	2018	2018	2019	2019	2020	2020
-	-	-	-	-	-	-	-	-	-	-	-	189	208	298	324
-	-	-	-	-	-	-	-	-	-	-	-	416	407	397	382
-	-	-	-	-	-	-	-	-	-	-	-	605	615	694	706
(0)	(0)	365	1,143	1,920	2,698	3,534	4,298	5,062	5,826	6,589	7,351	8,329	8,141	7,933	7,635
0	365	778	778	778	836	764	764	764	764	764	976	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	416	407	357	382
-	-	-	-	-	-	-	-	-	-	-	-	189	208	298	324
(0)	365	1,143	1,920	2,698	3,534	4,298	5,062	5,826	6,589	7,353	8,329	8,141	7,933	7,635	7,311
(0)	365	1,143	1,920	2,698	3,534	4,298	5,062	5,826	6,589	7,353	8,141	7,933	7,535	7,311	6,895
-	-	-	-	-	-	-	-	-	-	-	189	208	298	324	416
8,329	8,329	8,329	8,329	8,329	8,329	8,329	8,329	8,329	8,329	8,329	8,329	8,329	8,141	7,933	7,635
-	-	-	-	-	-	-	-	-	-	-	-	189	208	298	324
8,329	8,329	8,329	8,329	8,329	8,329	8,329	8,329	8,329	8,329	8,329	8,329	8,141	7,933	7,635	7,311
-	-	-	-	-	-	-	-	-	-	-	-	606	675	764	776
1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
-	-	-	-	-	-	-	-	-	-	-	-	416	407	397	382
-	-	-	-	-	-	-	-	-	-	-	-	189	208	298	324



CONCESSION AGREEMENT OF SWAT EXPRESSWAY

1-Jan-21	1-Jul-21	1-Jan-22	1-Jul-22	1-Jan-23	1-Jul-23	1-Jan-24	1-Jul-24	1-Jan-25	1-Jul-25	1-Jan-26	1-Jul-26	1-Jan-27	1-Jul-27
30-Jun-21	31-Dec-21	30-Jun-22	31-Dec-22	30-Jun-23	31-Dec-23	30-Jun-24	31-Dec-24	30-Jun-25	31-Dec-25	30-Jun-26	31-Dec-26	30-Jun-27	31-Dec-27
2021	2021	2022	2022	2023	2023	2024	2024	2025	2025	2026	2026	2027	2027

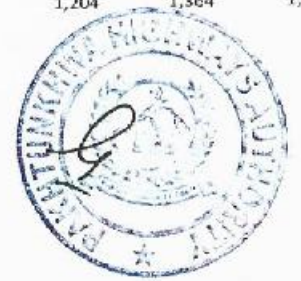
416	452	569	615	763	816	950	993	1,146	590	-	-	-	-
393	371	346	316	302	258	212	157	109	37	-	-	-	-
809	822	916	931	1,066	1,075	1,161	1,150	1,255	627	-	-	-	-

7,311	6,895	6,443	5,874	5,259	4,495	3,679	2,729	1,736	590	-	-	-	-
393	371	346	316	302	258	212	157	109	37	-	-	-	-
416	452	569	615	763	816	950	993	1,146	590	-	-	-	-
6,895	6,443	5,874	5,259	4,495	3,679	2,729	1,736	590	-	-	-	-	-

6,443	5,874	5,259	4,495	3,679	2,729	1,736	590	-	-	-	-	-	-
452	569	615	763	816	950	993	1,146	590	-	-	-	-	-

7,311	6,895	6,443	5,874	5,259	4,495	3,679	2,729	1,736	590	-	-	-	-
416	452	569	615	763	816	950	993	1,146	590	-	-	-	-
6,895	6,443	5,874	5,259	4,495	3,679	2,729	1,736	590	-	-	-	-	-

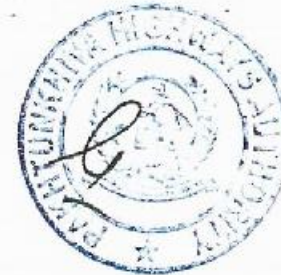
890	905	1,007	1,024	1,172	1,182	1,278	1,265	1,380	1,365	1,500	1,497	-	-
1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
393	371	346	316	302	258	212	157	109	37	-	-	-	-
416	452	569	615	763	816	950	993	1,146	1,204	1,364	1,361	-	-



**CONCESSION AGREEMENT OF SWAT EXPRESSWAY**

**KPHA Loan**

Repayment Type	Equity													
Loan Amount	5,500													
Payment Start Year	20													
Payment Start Date	1-Jul													
No. of Periods	10.00													
Target Return	4.50%													
Periodic Return	2.25%													
Interim Payment Amount	1													
Instalment Amount	1,437													
Payment Switch		FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
No. of Periods		-	-	-	-	-	-	-	-	-	-	-	-	-
IRR	4.50%	(2,804)	(211)	(211)	(211)	(211)	(213)	(209)	(209)	(209)	(209)	(208)	(210)	
IRR Check														
Interim Payment Switch		FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
Interim Payment	9.92	-	-	-	-	-	-	-	-	-	-	-	-	-
Coupon Payment														
Bond Repayment														





CONCESSION AGREEMENT OF SWAT EXPRESSWAY

FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
(252)	(134)														
FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE



CONCESSION AGREEMENT OF SWAT EXPRESSWAY



FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	1
FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	TRUE	1
.	.	.	.	.	.	.	.	.	.	.	.	.	.	1.00



CONCESSION AGREEMENT OF SWAT EXPRESSWAY

FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00





CONCESSION AGREEMENT OF SWAT EXPRESSWAY



FALSE	TRUE 1.00	TRUE 1.00	TRUE 1.00	TRUE 1.00	TRUE 1.00	TRUE 1.00	TRUE 1.00	TRUE 1.00	TRUE 1.00	TRUE 1.00	FALSE
1	1,437	1,437	1,437	1,437	1,437	1,437	1,437	1,437	1,437	1,437	-
TRUE 1	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
1.00	1,437	1,437	1,437	1,437	1,437	1,437	1,437	1,437	1,437	1,437	-



## Financing Structure

PKHA Subsidy Net Present Value	10,183
PKHA Revenue Share	-
Concessionaire Equity Commitment	8,329

Debt Terms	
Loan Type	Long Term Loan
Sources	Local Financiers
Repayment Type	Semi-Annual
Term	10
Grace Period	2
Interest Rate	9.0%
Required DSCR	1.10
Arrangement Fees	1.00%



**CONCESSION AGREEMENT OF SWAT EXPRESSWAY**

Cashflow Projections												
Concession Year	0	1	2	3	4	5	6	7	8	9	10	11
Gregorian Year	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
<b>Cashflow from Operations</b>				2,066	2,330	2,657	2,972	3,405	3,762	4,150	4,593	5,021
Revenue	-	-	-	39	44	51	57	65	72	79	87	96
Less: Collection Losses	-	-	-	-	-	-	-	-	-	-	-	-
<b>Less: OPEX</b>				443	487	536	589	648	713	784	863	949
Operational Costs	-	-	-	-	-	-	-	-	-	-	-	-
ETTM Cost	-	-	-	85	94	103	113	125	137	151	166	182
SPVC Cost	-	-	-	65	70	75	80	86	92	98	105	112
Main Carriageway Routine Maintenance Costs	-	-	-	5	5	6	6	6	7	7	8	8
Service Lanes Routine Maintenance Costs	-	-	-	-	-	-	-	-	-	-	-	2,052
Periodic Maintenance Costs	-	-	-	66	66	66	66	66	66	66	66	66
Insurance	-	-	-	-	-	-	-	-	-	-	-	-
Funding Costs	-	-	-	-	-	-	-	-	-	-	-	-
Less: Taxes	-	-	-	21	23	27	30	35	133	220	301	50
Less: Reserve Account Transfers (DSRA & MRA)	-	-	-	109	125	146	165	192	207	273	2,684	1,348
<b>Cashflow from Investing</b>												
Less: Fixed Capital Investment	-	21,076	13,089	-	-	-	-	-	-	-	-	-
<b>Cashflow from Financing</b>												
Add: Long Term Debt	-	(0)	8,329	-	-	-	-	-	-	-	-	-
Add: Equity Injection	-	5,199	3,131	-	-	-	-	-	-	-	-	-
Add: PKHA Upfront Subsidy	-	10,694	806	-	-	-	-	-	-	-	-	-
Add: PKHA Loan	-	5,115	385	-	-	-	-	-	-	-	-	-
Add: Toll During Construction	-	68	438	-	-	-	-	-	-	-	-	-
Less: Interest Expense	-	-	-	824	778	764	662	561	369	145	-	-
Less: Principal Repayments	-	-	-	397	622	858	1,185	1,579	1,943	1,736	-	-
Less: PKHA Loan	-	-	-	-	-	-	-	-	-	-	-	2
<b>Cashflow Available</b>	-	0	0	13	15	17	19	22	24	90	313	155
<b>Accumulated Cashflow</b>	-	0	0	13	27	44	64	86	110	200	513	668





**CONCESSION AGREEMENT OF SWAT EXPRESSWAY**

12 2028	13 2029	14 2030	15 2031	16 2032	17 2033	18 2034	19 2035	20 2036	21 2037	22 2038	23 2039	24 2040	25 2041
5,579	6,090	6,724	7,429	8,201	8,972	9,896	10,890	11,982	13,249	14,591	16,056	17,714	9,696
106	116	128	142	156	171	188	207	228	252	278	306	337	185
1,044	1,148	1,263	1,389	1,528	1,681	1,849	2,034	2,237	2,461	2,707	2,978	3,276	1,759
-	-	-	-	-	-	-	-	-	-	-	-	-	-
201	221	243	267	294	323	356	391	430	473	521	573	630	338
120	129	138	147	158	169	180	193	206	221	236	253	271	142
9	10	10	11	12	13	14	14	15	17	18	19	20	11
2,195	-	-	-	-	-	6,300	6,741	-	-	-	-	-	-
66	66	66	66	66	66	66	66	66	66	66	66	66	33
-	-	-	-	-	-	-	-	-	-	-	-	-	-
59	490	571	1,245	1,431	1,611	99	109	1,871	1,719	2,041	2,392	2,793	1,611
(5,751)	1,631	1,795	1,735	1,900	2,059	352	(9,472)	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	2	2	2	2	2	2	2	1,438	2,873	2,873	2,873	2,873	1,437
7,527	2,278	2,508	2,424	2,655	2,877	490	10,604	5,489	5,166	5,851	6,597	7,448	4,181
8,195	10,473	12,981	15,405	18,060	20,937	21,426	32,030	37,520	42,686	48,536	55,133	62,581	66,762



SCHEDULE K  
FORM OF HANDBACK CERTIFICATE

This handback certificate (this "**Handback Certificate**") is issued on this *[insert day]* day of *[insert month]* in the Year *[insert Year]* by *[insert details of the Independent Consultant]*.

Pursuant to the terms of the concession agreement dated *[insert date]* (the "**Agreement**") between PKHA and Swat Expressway Planning Construction and Operations (Private) Limited (the "**Concessionaire**"), whereby the Concessionaire has agreed to undertake the Project, as defined and detailed in the Agreement, on a build, operate and transfer basis (the "**Project**"), the Independent Consultant hereby certifies that the Project Assets comply with the Handback Requirements.

This Handback Certificate has the effect of releasing the Transfer Bond, constitutes evidence of divestment of all rights and title in the Project Assets by the Concessionaire and vesting thereof in PKHA and releases the Concessionaire from all its obligations under the Agreement.

*[insert the Independent Consultant's name]*

Witnesses:

1. *[insert details]*
2. *[insert details]*



**SCHEDULE L**  
**HANDBACK REQUIREMENTS**

Subject to the terms of this Agreement, on the Transfer Date, the Concessionaire shall comply with and conform to the following Handback Requirements in respect of the Project Assets:

PROJECT ASSETS	MINIMUM REQUIREMENTS
Site Clearance	Concession Area/Project Assets shall be free from debris, surplus material or leftover construction material
<b>Pavement Including Shoulders and Slopes</b>	
IRI	On the Expiry Date - Less than 2.0 per lane per km If Terminated during the Operation Period- Not greater than 3.0 per lane per km
Potholes/Depressions	Nil
Characteristic Deflection	As per Approved Detailed Design +/- 0.10%
Slopes (Pavement, Shoulder)	As per Approved Detailed Design +/- 0.10%
Cracking	Nil
Rut Depth Not Exceeding 10 mm	Length not more than 3% of the Expressway
Bleeding, Raveling	Nil
Pavement Edge Deformation	Nil
Pavement Edge Drop	Nil
Paved Shoulders	No reverse slope, no scouring and no drop off from hard shoulder and width as per Approved Detailed Design
Road Marking	100% with clear visibility and retro-reflection
<b>Roadside</b>	
Grass/Turfing/Vegetation	Neat, sight distance clear in intersections, passing zones, curves etc.
Slopes	No erosion and slope is stable
Slope Pitching	Neat and no disturbed pitching
<b>Drainage</b>	
Cross Pipes	No erosion, structurally sound, joints are all intact, clear, upstream and downstream side are clear and drains properly
Box Culverts / Slab Culverts	No erosion, structurally sound, joints are all intact, clear, upstream and downstream sides are clear and drain properly.
Drains/Ditches (Lined or Unlined)	All drains are clean, no damage and fully Functional





PROJECT ASSETS	MINIMUM REQUIREMENTS
Drainage Structures	Structurally sound, joints intact, no crack and drains properly
Kerb and Gutter	Structurally sound, functional and no spalling
<b>Structures</b>	
Bridges/Culverts/River Training Works	Smooth ride, structurally sound, no crack and fully functional. Parapet walls and railings are in perfect condition and freshly painted, NJB in perfect condition, wearing course perfectly sloped without any defect, expansion joints in perfect condition, bearings are all checked and approved by the Independent Engineer
Other Structures like Retaining Wall, Toe Wall, etc.	Structurally sound with no cracks, cleaned and painted where required
<b>Ancillary Works</b>	
Crash Barriers	Structurally sound, replaced with new one wherever broken, damaged or missing
Road Signs/Markings, Delineators, Road Studs etc. and Other Road Furniture	Good reflectivity, visible, undamaged, replaced with new ones wherever broken, damaged or missing, painted, present in proper location, properly mounted and all are functional
Illumination/Lighting	All lighting shall be functional and poles are properly erected and painted
Administrative Office, Centralized Operation Center, Toll Plazas, Service Areas and Weigh Stations	All buildings are in good shape and functional, fresh paintings inside and outside the building, no damage inside and outside the building, water supply, drainage system and electrical are all functional, no damage in the internal pavement, internal road pavement and parking area are resurfaced with road paintings freshly applied, all furniture are in satisfactory condition and broken ones are replaced with new one, furnishing items are replaced with fresh ones, water reservoir is clean, air-conditioners, water coolers, heaters etc. supplied are all in fairly good working condition.



**SCHEDULE M  
INTERCHANGES**

The following seven (7) Interchanges shall be established by the Concessionaire as part of the Works with the approximate Chainage as stated below.

SR. NO.	NAME AND LOCATION
1	Kernal Sher Khan Interchange on Motorway M-1 at Start Point (Recently constructed by NHA) <b>Km 0+000</b>
2	Dobian Interchange (Mardam-Dobian-Yar Hussain Road) <b>Km 9+700</b>
3	Mardan-Swabi Road Interchange (Ismaila-Baghicha Dheri) <b>Km 18+500</b>
4	Bakhshali-Mardan Road Interchange <b>Km 28+250</b>
5	Mardan-Katlang Road Interchange <b>Km 50+250</b>
6	Dargai-Palai Road Interchange <b>Km 61+000</b>
7	Chakdara Interchange (End Point) <b>Km 81+000</b>





**SCHEDULE N**  
**TORS OF THE INDEPENDENT AUDITOR**

1. The duties and responsibilities of the Independent Auditor shall include:
- (a) carrying out audits of the relevant project accounts bi-annually or at such other intervals as requested by PKHA, the Concessionaire or the Financiers and submit its report to PKHA, the Concessionaire and the Financiers and/or as specified in this Agreement, the PKHA Agreements, the IA Contract and the Financing Agreements and submitting reports in respect thereof to the Concessionaire, PKHA and the Financiers;
  - (b) conducting verification and audit of the Toll collection operations and the Other Revenue in accordance with the time-lines set out in this Agreement;
  - (c) determination of any Incremental and Consequential Costs to be borne by PKHA in accordance with this Agreement;
  - (d) determination of appropriate relief as a consequence of a Compensation Event, Relief Event and Unforeseeable Conduct, in accordance with the terms of this Agreement;
  - (e) determination of appropriate relief as a consequence of a Change in Law, in accordance with the terms of this Agreement;
  - (f) determination of the Termination Payment jointly with the Independent Engineer;
  - (g) on a six (6) monthly basis, preparing a report of the occurrence of any Permitted Events and the likely consequences thereof, jointly with the Independent Engineer;
  - (h) regularly reporting to Financiers in respect of various matters pertaining to this Agreement, the PKHA Agreements and Financing Agreements; and
  - (i) such other functions as stated in this Agreement, the Financing Agreements or as may be stipulated in the IA Contract.
2. **THE DELIVERABLES**
- (a) The Independent Auditor shall deliver to PKHA, Concessionaire and the Financiers the following:
    - i. a copy of all formal communications/correspondence/letters under the IA Contract;
    - ii. a copy of all the reports generated under the IA Contract;
    - iii. a copy of project inspection visit reports along with the observations and recommended remedial actions;
    - iv. a copy of audit reports after conducting audits; and

a presentation, whenever requested, about a particular issue or regarding the general status of the Project.





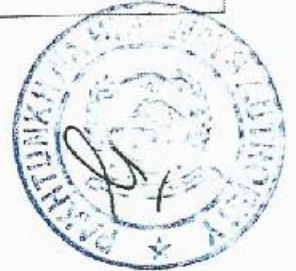
**SCHEDULE O**  
**TOLL PLAZAS**

The main Toll Plazas will be constructed at the following tentative locations:

SR. NO.	LOCATION	TENTATIVE CHAINAGE
1	Main Toll Plaza near Captain Kernel Sher Khan Interchange	Km 0+200
2	Main Toll Plaza near Chakdara Interchange	Km 81+000

Other Toll Plazas will be constructed at the following tentative locations:

SR. NO.	NAME AND LOCATION	TENTATIVE CHAINAGE
1	Dobian Interchange (Mardam-Dobian-Yar Hussain Road)	Km 9+700
2	Mardan-Swabi Road Interchange (Ismaila-Baghicha Dheti)	Km 18+500
3	Bakhshali-Mardan Road Interchange	Km 28+250
4	Mardan-Katlang Road Interchange	Km 50+250
5	Dargai-Palai Road Interchange	Km 61+000



SCHEDULE P  
PROJECT DESCRIPTION AND SCOPE OF WORKS

**PROJECT DESCRIPTION**

The GoKPK through PKHA has planned establishment of the Expressway. The planned Expressway forms part of an Economic trade corridor commencing from Kernal Sher Khan Interchange at M-1 Motorway and terminating at Chakdara at the junction of National Highways N-45 and N-95 (Malakand Agency). The proposed Expressway will provide an alternate route for Malakand Agency, District Swat, Lower & Upper Dir, Chitral, Shangla, Bajour Agency and other parts of the region improving interconnectivity and tourism within the country. It will attract most of the through traffic reducing traffic congestions and road accidents on the existing National Highway N-45 that passes through built-up towns of Rashakai, Mardan, Takhrbai, Shergah, Sakhakot, Dargai and Bathkela. The economic corridor envisages international linkages to Afghanistan and Central Asian States.

Presently, the Expressway is planned to be constructed as a 4-lane (2x2) controlled access facility, with provision of extension to six (6) lanes (3x3) on the outer side within the minimum 80m Right of Way (RoW). To facilitate freight traffic, the Expressway entails construction of tunnel(s) through Malakand mountain range towards the end point. The Project is to be implemented as a Public-Private Partnership (PPP) on a Build-Operate-Transfer (BOT) basis.

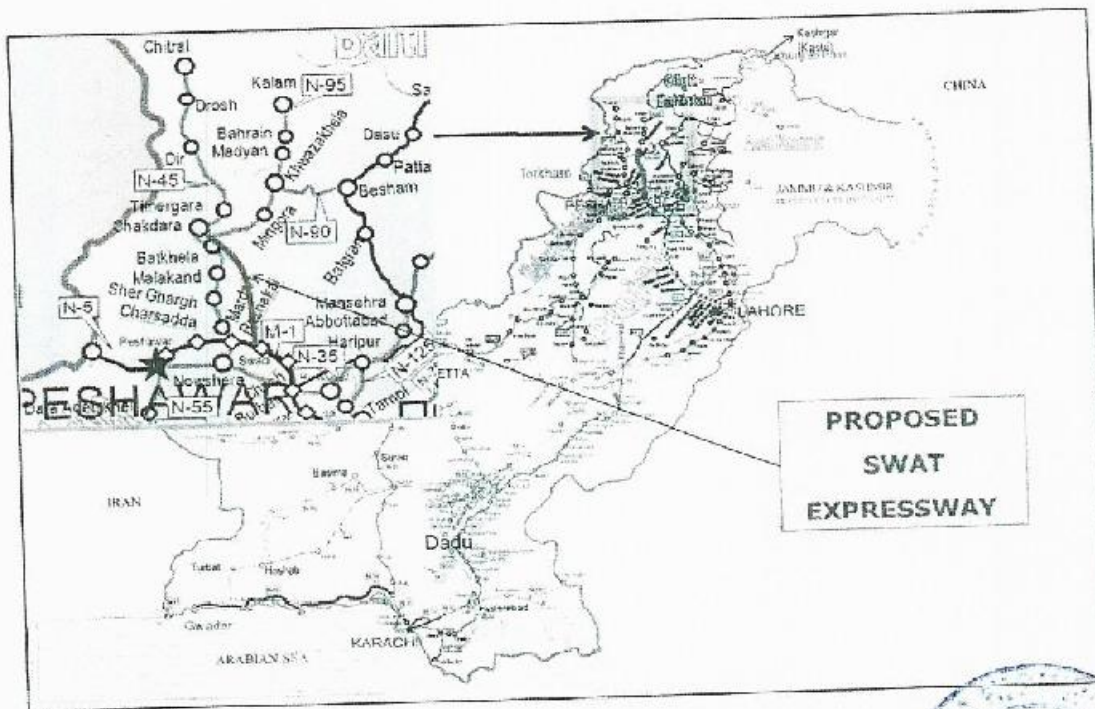


Figure 1: Location Plan of Swat Expressway





**MAIN INTERCHANGES-EXPRESSWAY**

In total, the Expressway shall comprise seven (7) Interchanges from start to end point. Out of the seven (7) Interchanges, the start point i.e. Kemal Sher Khan Interchange presently with half clover leaf design on the Motorway M-1 is constructed by National Highway Authority (NHA). This interchange needs to be re-modelled in accordance with the Approved Detailed Design. The remaining identified new six (6) Interchanges are to be constructed to facilitate access to local communities, towns and villages along the alignment, at the tentative locations specified in the **SCHEDULE M [INTERCHANGES]**.

The alignment plan of the proposed Swat Expressway is as given in **Figure 2** below:

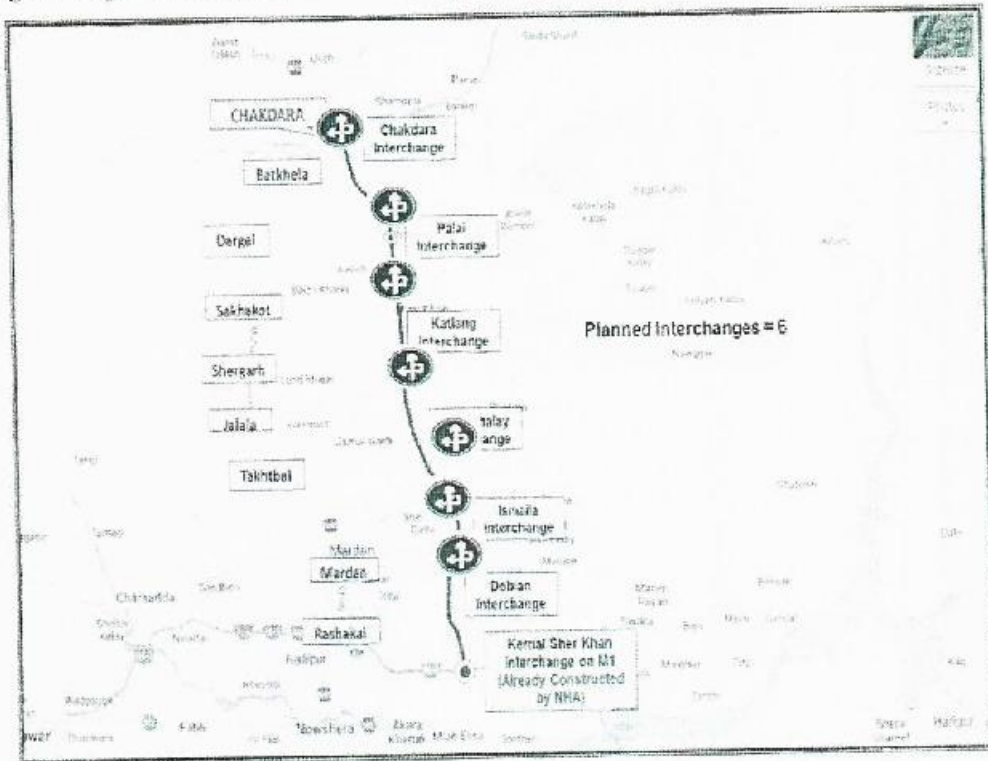


Figure 2: Alignment Plan of the Expressway with Planned Interchanges





**SCOPE OF WORK**

The Project envisages construction of an approximately 81 Kms long 4-lane Expressway between Kernal Sher Khan Interchange on Motorway M1 and Chakdara on National Highway N45 with all earthworks, pavement works, structures including culverts and bridges, tunnel(s) with electromechanical works, Interchanges with Toll Plaza and building works, underpasses, flyovers, cattle creeps, drainage and erosion protection works, service roads, landscaping/horticulture, ancillary works and Intelligent Transportation System (ITS). The specific features of the scope of the Project shall be as follows:

1. Construction of a 4-lane Expressway divided controlled access/exit with standard NJB as median and fences with a minimum ROW of 80 m (265 ft Approx). Typical cross-sections are attached with this **SCHEDULE Q** [*PROJECT DESCRIPTION AND SCOPE OF WORKS*]. The embankment slope shall be determined as per the Approved Detailed Design. The Expressway shall be a fenced facility having ROW of 80m to secure the future extension of the roadway;
2. The Detailed Design shall be done as per the minimum requirement of Design Criteria given in **SCHEDULE G** [*CONSTRUCTION PERFORMANCE STANDARDS*]. The Expressway shall be environmentally and eco-friendly;
3. For the main carriageway, flexible pavement shall be with four (4) lane divided with NJB, with each lane comprising of 3.65m in width, 1m paved inner shoulder, and 3m TST outer shoulder and 0.5m rounding (the "**Main Carriageway**"). Design of rigid pavement may be considered for restricted lengths where deemed necessary;
4. The Main Carriageway design shall cater for water-logged areas where seasonal water-table variations are expected. Capillary layers and or granular material platform shall be provided in sectional lengths (where needed);
5. TST Service Road outside the fence shall be provided on either side of the Main Carriageway to facilitate the adjacent settlements and farming community. The Service Road shall be 3.65 m wide with 1m granular shoulders on either side. The Service Road shall be provided with adequate embankment height and cross-drainage structures in accordance with Approved Detailed Design. The total length of the TST Service Road shall be maximum of thirty percent (30%) of the length of the Main Carriageway or as decided by the Independent Engineer;
6. The Concessionaire shall be responsible to maintain and keep the Service Road operational throughout the Concession Period;
7. The Concessionaire shall, at its own cost and expense, be responsible for constructing and operating any additional lane(s) in future for every qualified Section of the Expressway, where the level of service falls below "C" during initial 15 years of the Concession Period, as per Highway Capacity Manual (latest version);
8. Cattle creeps (at least 3.0 meter clearance), Underpasses and Flyovers (5.2 meter Clearance) and pedestrian bridges (with ramp facility for motorcyclists) at appropriate locations (where needed) shall be provided for smooth movement of people/cattle in the vicinity of the Expressway;



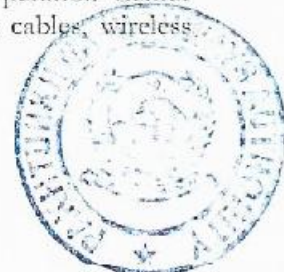
9. The Concessionaire will construct 2 x Expressway Service Areas (with minimal facilities including Mosque, Tuck Shop, Parking facilities, and Toilets) on the locations determined in accordance with the terms of this Agreement. PKHA will procure land for the Expressway Service Areas and Rest Areas as per the Detailed Design. However, the Development Rights of the Expressway Service Areas will remain with Concessionaire as per this Agreement;
10. The following facilities may be provided at the Expressway Service Areas in accordance with the terms of this Agreement:
- (a) Restaurants/Food Courts/Fast Food;
  - (b) Fuel Filling Stations with Tuck Shops;
  - (c) Medical Centre: Medical point having first aid facilities;
  - (d) Children Play Area;
  - (e) Mini workshop with recovery facility;
  - (f) *Aam Sarai* and *Dhaba* (with Trucks/Buses Parking);
  - (g) Internal Roads, Sewerage, Water Supply and Electric supply with electricity backup and Gas supply;
  - (h) Business center with fax, internet, photocopying facility and ATM machines;
  - (i) Free Wi-Fi facility;
  - (j) Community shops.
11. Provisions shall be made to mitigate disruptions (due to Expressway embankment construction) caused to existing irrigation channels and water courses crossings (lined and unlined) used for agriculture throughout the Expressway alignment;
12. Local roads (provincial, district & municipal) with motorized traffic, shall be provided with flyovers or underpass (where feasible) for cross over through the expressway. Such locations may include the existing road to be re-aligned for technical reasons upto shorter distances. Depending upon the design all such roads shall be constructed maximum 500m on either side and provided with appropriate pavement overlays;
13. The provincial or National Highways at two (2) of the major Interchanges (Km 18+500 & Km 81 end point) shall be of four (4) lane facility maximum up to 500m, if required on either side, for purposes of streamlining the traffic. The Interchanges will be converted from half clover leaf to full clover leaf interchange to meet the traffic requirement;
14. State of the art and fully automated Toll Plazas shall be established equipped with Advance Electronic Toll Collection system. Main Toll Plaza shall be designed as per traffic requirement, whereas the entry/exit Toll Plaza at the Interchanges shall have three (3) bays on major Interchanges and two (2) bays on minor Interchanges in each direction. Toll Plazas shall be supported by, but not be limited to; an administration building and power backups;
15. Permanent Weigh Stations or full featured High Speed Weigh-in-motion (WIM) station shall be established at appropriate locations;
16. If required, auxiliary lanes for the Expressway Service Areas, Rest Area and Lay-Bye etc. shall be provided;
17. Anti-glare PVC adjustable shield at required locations where safety demands, but not limited to, at sharp curves shall be provided;





18. LED/latest technology lighting shall be provided at the Interchanges, the Toll Plazas and tunnel(s);
19. Drainage along curbed shoulders with chutes and water inlets in inner shoulders at super-elevated sections shall be provided;
20. Road furniture and road structure safety features including, but not limited to, the following shall be provided:
  - Reflectorized lane markings; Pavement marking shall be Thermoplastic or chlorinated rubber reflective paint for lane dividers, shoulder line, chevron, acceleration and deceleration dividers;
  - Emergency parking areas;
  - Indented strips for warning against driving on shoulders;
  - Expressway signage and Gantries as per the international Expressway standards;
  - Raised pavement markers shall be fixed as per international standards;
  - Informative and other road signage shall be as per M-2 standards;
  - Cat-eyes on carriageway lines, bridges, shoulders and dead ends shall be fixed with colour/reflection as per standard international standards;
  - Reflective tape beacons/reflectors shall be fixed on new-jersey barrier top where safety demands;
  - Metallic beam guardrail shall be installed where required.
21. Ducts for existing utility crossings across the carriageway shall be provided where required;
22. The criteria suggests normal embankment slope conditions provided on highways and motorways. However, the same may be vary as per specifications of the material used for construction as per safe angle of repose to avoid instability of embankment slope;
23. The portal faces along the mountain height and width shall be stabilized with proper benching requirements and slope stabilization to mitigate against any potential sliding hazard, if required, throughout the Expressway. The hazard mapping study shall be conducted to safe guard the Expressway in adverse climatic condition;
24. State of the Art **Intelligent Transportation Systems (ITS)** along the Expressway including but not limited to the following:
  - **Centralized Operation Centre**  
 One (1) in the centralized position on the Expressway for close monitoring of traffic situations, analysis & processing of the information collected & received from the ITS devises installed on the Expressway and dissemination of the information to the users and operators for efficient traffic management and maintenance of the Expressway facility;
  - **Communication Systems and Cables**

For voice, data and video communication between Centralized Operation Center from its central computer and ITS devices in the field, fiber optic cables, wireless





connectivity, copper twisted pair cable, IP telephone Communication or microwave transmission shall be provided (whether purchased or rented) all along the Expressway;

- **Advanced Traveller Information Systems**

- Variable (Dynamic) Message Sign at selected points
- Emergency Call Systems at 2 kms in alternating pattern, along the Alignment and Designated Areas;

- **Electronic Toll Collection Systems**

Installation of state-of-the-art electronic Toll, overloading fine and police fine collection system (E-System) & Automatic Vehicle Classification (AVC), Automatic Vehicle Identification, Automatic Number Plate Recognition with necessary hardware, software and back-up support. The E-system shall have automatic vehicle classification (AVC), with multimodal transaction facility i.e. cash, contact-less smart card, E-tag, Fleet Cards etc. The Toll collection system shall operate through a Central Clearing House (CCH) on the Expressway which shall be linked to a Central Operations Centre and PKHA Headquarters, Peshawar;

- **Solar Power, UPS Back-up or Generator Back-up**

Uninterrupted power supply i.e. UPS/Generator/Solar (2 sets one in use and other in backup), where required, for the all the ITS devices, Central Operation Center, Toll Plazas, Weigh stations, Expressway Service Areas and Rest Areas shall be provided.

25. **INTERCHANGES**

Interchanges shall be established as per the Detailed Design and **SCHEDULE M [INTERCHANGES]**. The Concessionaire may deviate from the type of Interchanges as specified in the RFP. However, Concessionaire will take approval in Detailed Design for changes suggested.

The Concessionaire shall also facilitate any futuristic development requirements of additional Interchanges (if required).

26. **LIGHTING**

Lighting shall be provided at required locations such as Interchanges, Major bridges, Toll Plazas, Weigh Bridges, Traffic signs, ITS devices etc. with the following requirements:

- Lighting at the Expressway Interchange shall be provided at-least 1 km
- Road Lighting for Expressway Service Areas shall be extended up to 500m backwards from the start of the exit ramp and 500m beyond the end point of acceleration lane as per international standards with offset
- Advanced LEDs lamps shall be used for lighting. Uniform white light dissipation and not black spots on the carriageway



- LED lamps to uniformly illuminate all traffic sign plates

27. **HORTICULTURE AND LANDSCAPING**

The landscaping shall be done envisaging the holistic approach to the entire length of Expressway. A concept shall be evolved so as to maintain visual characteristics and uniformity in terms of landscape along the stretch. A well-organized sustainable indigenous Tree plantation and horticulture along the Expressway as well as at interchanges, layby and service areas are required. The embankment slopes shall be green, the ROW should be cleared from all earlier plantation, area graded and green grass planted.

**Zones**

The entire stretch of the project shall be divided into homogenous landscape sections (zones) based on similarity in terms of soil conditions, climate (temperature and rainfall) and topography. The selection of the suitable species shall be made after the detail study on the local flora and vegetative cover for the particular zone.

**Plant Selection**

The selection of plant types and planting arrangement shall be based on the following considerations:

- Screening and Shade
- Aesthetics (Ornamental Plantation including Flowering Trees, Low height Shrub Plants for median plantation and Creepers)
- Horticulture Crops (Fruit & vegetables plantation, Cut Flowers, Nursery & Forestry plantation, Sod & Herbs Farming)
- Grassing on slopes

28. The Concessionaire will also ensure provision of following facilities and will maintain them in a good working condition throughout the Concession Period from such time as such facilities are to be provided in accordance with the Approved Detailed Design or the O&M Manual, as applicable:

- Breakdown and accident response system;
- Vehicle fitness checking system on applicable international standards;
- Comprehensive accident management and rescue-recovery system with necessary infrastructure;

29. Emergency assistance system including, but not limited, to:

- mobile workshops;
- traffic patrol surveillance system equipped with cameras, radios and speed monitoring devices;





- Fully equipped state of the art Ambulances shall be provided in appropriate number and location to meet the requirement of minimum rescue time as per international motorway standards;
  - firefighting equipment;
  - towing vehicles;
30. The Concessionaire shall ensure time based recovery system. Time based maintenance system shall be evolved along with manuals and standards operating procedures. The recovery drill shall be approved/carried out periodically to be witnessed by the PKHA Representative;
31. Similarly, the maintenance practices shall be time bound with pre-developed modules and time lines supported by standard operating procedures and manuals;
32. **RIDING QUALITY**

The roughness of the pavement level (riding quality) for the Concession Period, in terms of International Roughness Index (IRI - m/km), over any one (1) kilometer length of any single lane shall be as follows:

- Upon Construction Completion IRI less than 1.4
- During the Operations Period IRI less than 3.0
- Upon overlay/rehabilitation IRI less than 1.8
- On the Transfer Date IRI less than 2.0

During Operations Period, in case IRI reaches or exceeds 3.0 in any particular reach on a stretch more than one (1) kilometre on any lane, the Concessionaire is expected to immediately initiate the work to bring back the IRI to the acceptable limit.

When IRI reaches the limit of 3.0 over 1/3<sup>rd</sup> of length of the Expressway in aggregate (1/3<sup>rd</sup> of total Expressway length) periodic overlay/rehabilitation shall be programmed and agreed with PKHA and commenced within sixty (60) days of such findings. Program shall be commenced with the worst portion and cover entire length of the Expressway.

The above riding quality standards, among others, shall be major performance criteria of the Concessionaire's performance failing which shall be considered as a Material Breach of the Concessionaire and may result in Termination of this Agreement in accordance with the terms of this Agreement.

33. **FACILITIES FOR PKHA REPRESENTATIVE**

The Concessionaire shall provide for the PKHA Representative and project staff:

- The Concessionaire shall provide for the PKHA Representative an office at the Concession Area (measuring minimum 10,000 sq. feet covered area) with all fitting and fixtures including furnishing (during the Construction Period) and the transportation facilities that includes: two (2) Nos. Double Cabins (4x4), four (4) Nos. Toyota Corolla GLI (or equivalent), two (2) Nos. single cabin Toyota Pickup.





with the cost of operation (i.e. driver and fuel) and repair/maintenance throughout the Construction Period;

- The Concessionaire shall be responsible to provide all the above facilities subsequent to achievement of Financial Close. Upon completion of the Concession Period, all these facilities shall be transferred to PKHA along with the other Project Assets at no cost to PKHA.

34. **TRAINING TO PKHA OFFICIALS**

The Concessionaire shall arrange, at least for four (4) officials of PKHA, training abroad in the fields of:

- PPP project structuring/development: The training level must be equal to or better than that provided by the IP3 Institute USA; and
- PPP project implementation: Arranging a visit abroad to visit PPP projects to have experience of implementation of PPP projects.

35. **INDEPENDENT ENGINEER FACILITIES**

The Concessionaire shall provide and maintain fully equipped laboratory for the Independent Engineer. The Concessionaire shall also provide furnished office and accommodation within the Concession Area. The Concessionaire shall also provide transportation facilities, as per actual requirement;

36. The Concessionaire shall be responsible for maintenance of the Project and its allied facilities including inter alia the Toll Plazas, weigh stations, Expressway Services Areas, trauma center, ITS field devices, sign boards, gantries, poles and all other structures etc.;

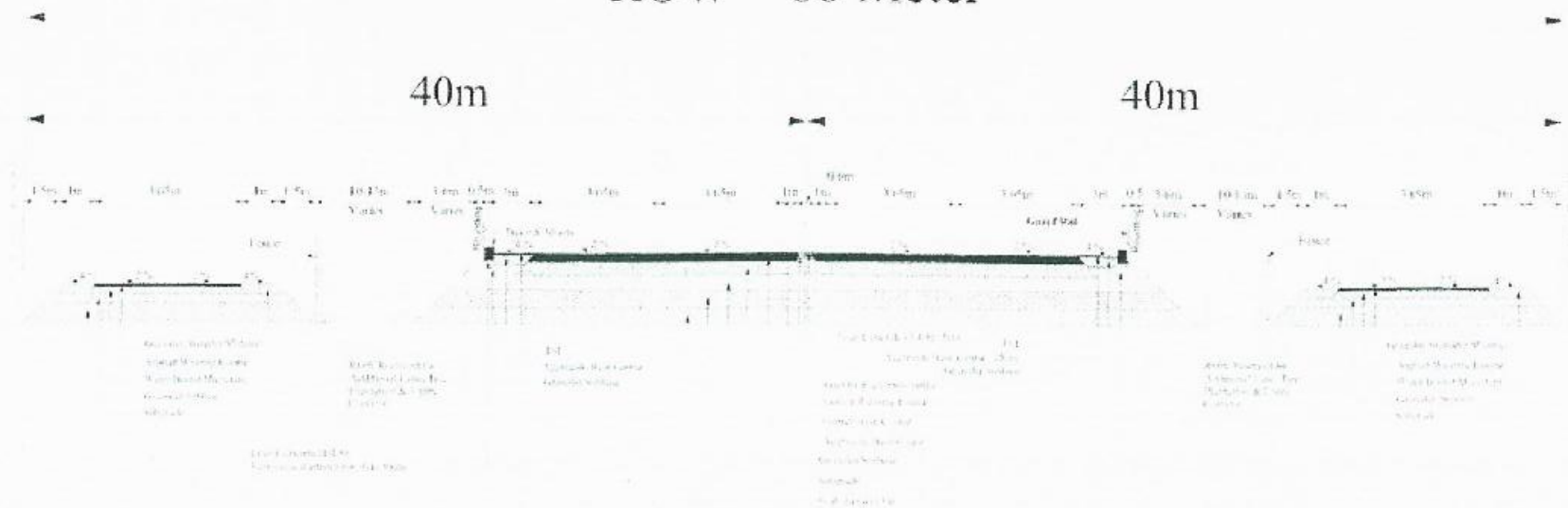
37. At the end of the Concession Period, the Project Assets and all other assets and facilities specified in this Agreement shall be returned to PKHA in compliance with the Handback Requirements, all in accordance with the terms of this Agreement;

The typical cross-sections are attached below:

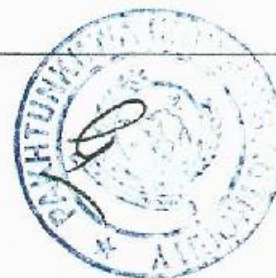


# CROSS SECTIONAL DETAILING FOR FOUR (4) LANE SWAT EXPRESSWAY (EXTENDABLE TO SIX LANE)

ROW = 80 Meter

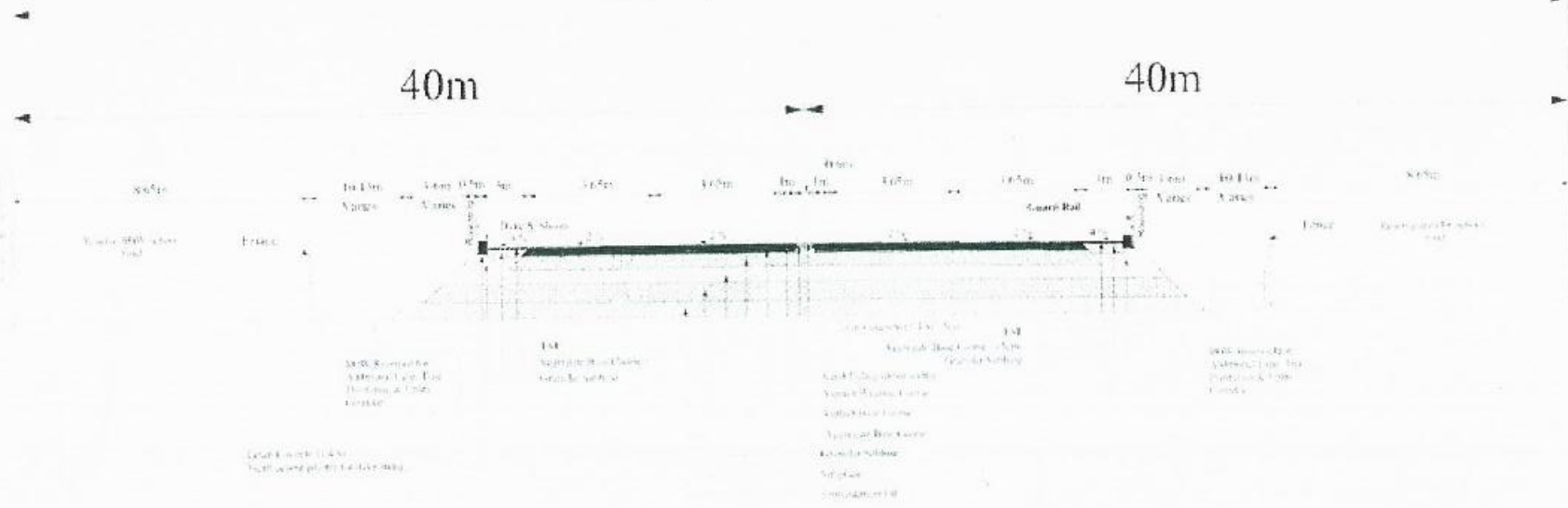


**TYPICAL CROSS SECTION**  
(With Service Road on Both side)



# CROSS SECTIONAL DETAILING FOR FOUR (4) LANE SWAT EXPRESSWAY (EXTENDABLE TO SIX LANE)

ROW = 80 Meter



## TYPICAL CROSS SECTION

(With Reserved ROW for Service Road on Both Sides)







## 38. TUNNEL

The impediment facing alignment of the Expressway is Malakand mountain range. The elevation difference of approximately 700 to 800 ft has to be covered in a comparatively steep mountainous terrain. The existing alignment design traverses across the Malakand mountain range in the vicinity of village Shahkot on the southern end while on the northern end the expressway will descend on to village Zulamkot and Allahdand while finally terminating at end point near the existing Chakdara bridge.

To overcome this impediment a two (02) tube uni-direction, 4 lane (2 lanes each tube) tunnel at the proposed location of cross-over is proposed. The estimated length along the proposed mountain range is expected to be approx: 1 to 2. km (single tube).

Following requirements for Road Tunnel Alignment & Construction shall be broadly met.

**Tunnel Alignment**

- a. The permissible/desirable gradient shall be 1.5% to 2.5%. However given the elevation difference of southern & northern portals the gradient of the Tunnels may enhance due to compelling technical reasons and shall comply with international standards.
- b. The Construction shall be executed on the principle of "New Austrian Tunnelling Method (NATM)".
- c. Topography of proposed site, the general Lithology of site is to be developed. Thereupon, the tentative tunnel alignment shall be established.

**Tunnel Approaches**

The approach road on the northern portal (Chakdara side) is expected to be approximately 3km while on the southern portal (Palai side) the approach is estimated to be 5 to 6km approximately. The southern portal approach road would need to negotiate grade to compensate for elevation difference to ascend towards north portal. The grades shall be kept in normal range with relief grades recommended for expressways & road tunnels. The approach alignments shall ensure minimal displacement of local settlements, public amenities & graveyards. The approach for the southern portal needs to be lifted to appropriate level to negotiate the cross over grades of the tunnel.

**Tunnel Design**

- a. Detail Geotechnical Investigation i.e. rock core drilling to obtain subsurface stratification up to proposed/tentative alignment wherein, the study and evaluation of strata, Rock Quality Designation, Rock Joint detail, shall to be carried out.





- b. The necessary laboratory test will be executed to determine the Unconfined Compression Strength of Rock and other test which are deem necessary in evaluation of site characteristics.
- c. Detail design to be executed on the basis of NATM guide lines.
- d. Each Tunnel Tube contains two lane of 3.65 Meter width (2x3.65) with 1 meter of walkway on each side of carriageway. The cushion between the outer lanes and walkway shall be at least 0.25m shoulder which may also serve as gutter drain.
- e. The Clear height for the traffic chamber shall be 5.2 Meter.
- f. Rigid Pavement structure shall be provided within the Tunnel. The IRI of the tunnel pavements shall not be more than 1.7 after construction.
- g. The cross connection through tunnel Adits may be provided between two tunnels as per requirement and safety standards. The same will act as emergency exits.
- h. The laybys will be provided as per requirement and safety standards. The fire resistance structure will be ensured to sustain the temperature of 2000°C.
- i. The Surface Drainage will be ensured through provision of subsurface pipes adequately keeping in view tunnel surrounding water and tunnel road pavement drainage.
- j. Adequate provision of cable conduits shall be provided to fulfil the need of tunnel as required in tunnel signaling, surveillance, and communication.
- k. The effective firefighting system should be provided for worst scenarios. Necessary provision of water pipe will be ensured throughout the length of tunnel.

#### Tunnel Allied Facilities

- a. Lighting:
  - Normal lighting shall be provided so as to ensure appropriate visibility day and night for drivers in the entrance zone as well as in the interior of the tunnel.
  - Safety lighting shall be provided to allow a minimum visibility for tunnel users to evacuate the tunnel in their vehicles in the event of a breakdown of the power supply.
  - Evacuation lighting, such as evacuation marker lights, at a height of no more than 1.5 meters, shall be provided to guide tunnel users to evacuate the tunnel on foot, in the event of emergency.
- b. Ventilation:
  - An electro-mechanical ventilation system shall be installed as per the Approved Detailed Design if required.
  - The design, construction and operation of the ventilation system (if installed) shall take following into account:

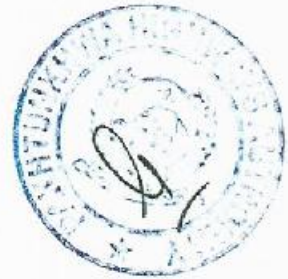




- The control of pollutants emitted by road vehicles, under normal and peak traffic flow,
  - The control of pollutants emitted by road vehicles where traffic is stopped due to an incident or an accident,
  - The control of heat and smoke in the event of a fire.
- c. Emergency stations:
- Emergency stations shall consist of a box on the sidewall or preferably a recess in the sidewall. They shall be equipped with at least an emergency telephone and two fire extinguishers.
  - Emergency stations shall be provided near the portals and inside the tunnels at intervals of 500 meters.
- d. Road Signs shall be used for all safety facilities provided for the tunnel users.
- e. Water supply shall be provided for the tunnel(s). Hydrants shall be provided near the portals and inside at intervals which shall not exceed 250 meters.
- f. Control Centre is to be established for the tunnel with surveillance system.
- g. Monitoring systems:
- Video monitoring systems and a system able to automatically detect traffic incidents (such as stopping vehicles) and/or fires shall be installed in the tunnel.
  - Automatic fire-detection systems shall be installed in the tunnel.
- h. Power supply and electrical circuits:
- The Power Supply system is design on basis of connection from WAPDA or any source within the Malakand/Swat Region.
  - The standby power supply in the form of Generators or other source is to be provided for un-interrupted power supply.
- i. Fire resistance of equipment:
- The level of fire resistance of tunnel equipment shall take into account the technological possibilities and aim at maintaining the necessary safety functions in the event of a fire.
  - A comprehensive Operation manual shall be developed. Training of operation and management team shall be ensured.
  - A simulation exercise shall be carried out for confirmation and optimization of all operational systems.

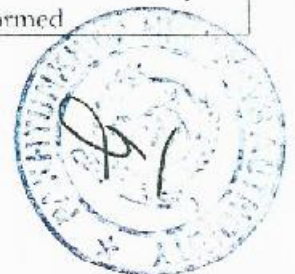


SCHEDULE Q  
NOT USED



SCHEDULE R  
O&M REQUIREMENTS

ASSET	OUTCOME	PERFORMANCE TARGET: % OF ASSET THAT SHALL BE IN THE OUTCOME DESCRIBED CONDITION	CONDITION ASSESSMENT ACCEPTANCE, CRITERIA AND SERVICES DELIVERY
<b>1. Pavement including Shoulders and Slopes</b>			
Paved Lanes (Asphalt)	Smooth Safe Adequate Skid Resistance Durable	95  IRI not greater than 3.0 m/km/lane	Tolerances / Criteria
			On achieving IRI = 3.0 m/km/lane, overlay will be due and IRI to be achieved as IRI not greater than 1.8 m/Km/lane
			ruts not more than 10 mm
			No structural cracks, non-structural cracks between 2mm to 6 mm. Crack sealing (if any) as per O&M Manual.
			Potholes free
			No shoving > 7 spot per km
			No bleeding / raveling
			no edge deformation
			no shallow depression
			Patching even +/- 15 mm higher or lower
			Roughness not > 3.5 m/km
			no false ditch (shoulder build up causes water to drain back on to the pavement)
<b>Timelines Requirement:</b> Potholes causing a threat to safety will be responded to immediately Others within 2-3 days of notification Bleeding surface to be treated immediately within 5 day			
Paved Shoulders (If any)	Safe Smooth (No standing of water) Adequate width	90	Tolerances / Criteria
			No reverse slope, no edge step and no drop off
			no false ditch (shoulder build up causes water to drain back on to the pavement) no scouring order formation
			<b>Timelines Requirement:</b> Shall be corrected within 2-3 days if shoulder are deformed



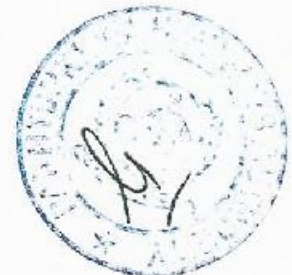


ASSET	OUTCOME	PERFORMANCE TARGET: % OF ASSET THAT SHALL BE IN THE OUTCOME DESCRIBED CONDITION	CONDITION ASSESSMENT ACCEPTANCE, CRITERIA AND SERVICES DELIVERY
<b>3. Drainage</b>			
Cross pipes	Structurally sound Open drains properly Joints intact Adequate Capacity No erosion	95	Tolerances / Criteria
			<5% deteriorated barrel
			>90% diameter open drains properly
			joints intact
			must be free of blockade
			minimal erosion at ends
			end protection intact
			no dip in road over pipe indicating structural problems
Box Culverts / Slab Culverts	Structurally sound Open Drains properly Joints intact Adequate Capacity No Erosion	95	Tolerances / Criteria
			<5% deteriorated barrel
			>95% diameter open drains properly
			joints intact
			no evidence of flooding
			minimal erosion at ends
			end protection intact
			no dip in road over pipe indicating structural problems
Ditches Paved / Lined drains	Aligned Structurally sound Clean	95	Tolerances / Criteria
			no undermining or undercut requiring action
			<25% spalled
			no obstruction to flow of water that requires action
Ditches, Unpaved / Unlined drains	Drain Functional	95	Tolerances / Criteria
			grade drains
			minimal erosion
			outfalls functional
			no obstruction to flow of water that requires action
			no siltation



ASSET	OUTCOME	PERFORMANCE TARGET: % OF ASSET THAT SHALL BE IN THE OUTCOME DESCRIBED CONDITION	CONDITION ASSESSMENT ACCEPTANCE, CRITERIA AND SERVICES DELIVERY
Storm Drains Drop inlets	Open No flooding No settlement	95	Tolerances / Criteria
			95% open
			no evidence of flooding
Kerb and Gutter	In line Clean/drain Sound No undermining	95	Tolerances / Criteria
			minimal obstruction
			no unsealed cracks > 6 mm
			no spalling > 1/4 inch deep
Erosion or Scour in upstream/ downstream	No erosion due to Scour	95	Tolerances / Criteria
			Erosion not to be allowed to continue
<b>Timelines Requirement:</b>	For all the above cases repair or reconstruction shall be attended and completed within a week		

4. Bridges/Culverts			
Overall Bridge	Smooth ride, aesthetic, wide and available at legal speed limit	Strong, enough at legal	Structurally Sound as per International Expressway Standard
			no graffiti on structures
			<b>Timelines Required:</b> structurally critical conditions must be notified immediately and reported within next 24 hours timeframe



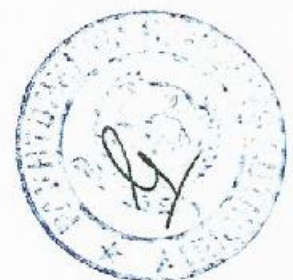


ASSET	OUTCOME	PERFORMANCE TARGET: % OF ASSET THAT SHALL BE IN THE OUTCOME DESCRIBED CONDITION	CONDITION ASSESSMENT ACCEPTANCE, CRITERIA AND SERVICES DELIVERY
Traffic Safety Features (Railings Parapet, Wing walls, Drainage spouts etc)	Percent Functional		Tolerances / Criteria
		As per approved O & M Manual	Functional
			<b>Timelines Required:</b> Repair or replace badly damaged traffic safety features within 1-2 days
Deck	Smooth Strong Wide enough Drains properly	As per Approved O & M Manual	Tolerances / Criteria
			minimal spalls cracks or scaling clean deck
			Drains / scuppers are clean and functional
Super structure	Strong Clearance Aesthetic		Tolerances / Criteria
			no loss of section or cracks
			paint in good shape
			no spalling
			proper vertical clearance proper opening
Sub structure Joints	Strong looks good safe from settlement all components Smooth do not leak		Tolerances / Criteria
			no spalls, cracks, scaling
			bearing assemblies functional abutment seats cleaned and sound
			pier seats clean and sound
			bearings clean, sound and lubricated periodically





ASSET	OUTCOME	PERFORMANCE TARGET: % OF ASSET THAT SHALL BE IN THE OUTCOME DESCRIBED CONDITION	CONDITION ASSESSMENT ACCEPTANCE, CRITERIA AND SERVICES DELIVERY
Structural culverts	Structurally sound Open Proper Passage joints intact Adequate Capacity No erosion	95	Tolerances / Criteria
			<10% deteriorated barrel
			>95% diameter open
			minimal erosion at ends
			correct grade
			joints intact
			no evidence of flooding
			end protection intact
Retaining Walls	Stable Strong	95	Tolerances / Criteria
			no spalling or cracks
			weep holes open
			no indication of settlement or rotation
Drainage	Functional and Efficient	95	Tolerances / Criteria
			Vegetation clean
			Protection present and functional
			no embankment erosion
<b>5. Road Signs and Road Furniture</b>			
Signs (includes overhead signs)	Good reflectively visible undamaged placed according to standards	As per O & M Manual	Tolerances / Criteria
			95% clear of obstruction
			90% surface free of damage
			placement works for motorist at posted speed
			<b>Timelines Required:</b> replace warning and regulatory signs within 24 hours of notification



ASSET	OUTCOME	PERFORMANCE TARGET: % OF ASSET THAT SHALL BE IN THE OUTCOME DESCRIBED CONDITION	CONDITION ASSESSMENT ACCEPTANCE, CRITERIA AND SERVICES DELIVERY
Pavement marking Object markers and Delineators, Km stone / 5 km stone	Bright visible Present Painted in 2 languages intact upright Reflective present in right location	As per O & M Manual	Tolerances / Criteria
			95% clear of debris
			<5% of surface damaged
			placement meets industry standards
Bench marks reference pillars	Present reinforced painted	95	Tolerances / Criteria
			90% clear of obstruction
			Placement meets industry standards
			<10% damaged
Painting & printing letters on Road Signs km stone And 5km stone	painted to match with existing	95	Tolerances / Criteria
			90% clear of obstruction
			To match with the existing
<b>6. Other Facilities</b>			
Street Lighting	Functional Wiring proper undamaged painting	90	Tolerances / Criteria
			98% lights functional
			98% clear obstruction
			<b>Timelines Required:</b> Remedy the reason of non-functional of lights so that lighting is restored within 6 hours
Wayside amenity/ truck lay by	functional building toilet Water supply drainage pavement lighting landscaping	90	Tolerances / Criteria
			water supply, drainage & lighting always shall be functional
			98% lights functional in the building or outside the building
			95% of total time the water supply and drainage functional
			95% of total paved area are crack free / pot hole free
			95% of kerbs and channel

