



MILLENNIUM CHALLENGE ACCOUNT NEPAL (MCA-NEPAL)

OUTREACH EVENT – UPCOMING PROCUREMENTS ROAD MAINTENANCE PROJECT

Pilot Road Recycling Project

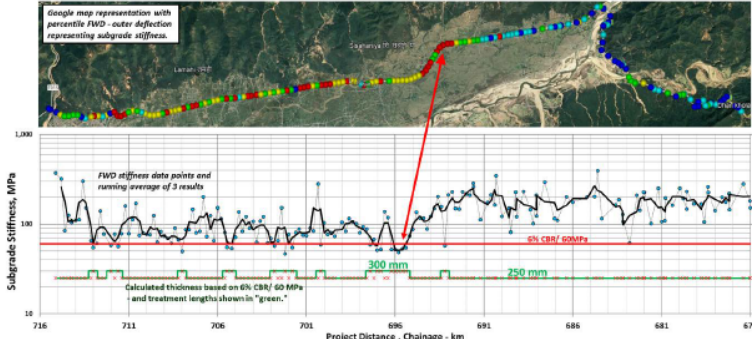
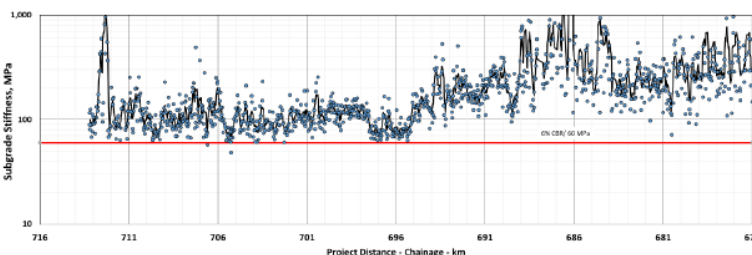
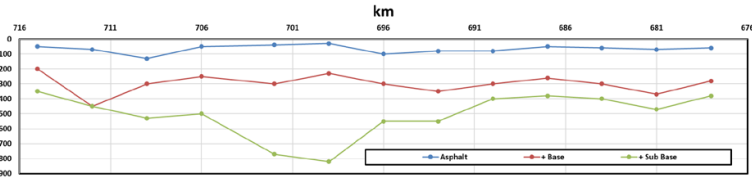
East – West Highway – Dhan Khola Lamahi Road Section (DLRS)

15th April 2024

Questions and Answers Sessions


No.	Question	Response
Noted questions raised in the floor		
1.	What is the budget weightage of the RMP in the Compact?	Please see the Compact, Annex II Multi-Year Financial Plan Summary at https://mcanp.org/en/documents-reports/main-agreements/ .
2.	Who is the implementing agency?	Millennium Challenge Account Nepal (MCA-Nepal) is the Accountable Entity and Implementing Agency.
3.	What is the status of Substation and Transmission Line Project?	Currently, the procurement for three Substations is at the final stage of contract negotiations while there is a Procurement for Cross-border Transmission Line (18km) already launched and pending offers submission.
4.	Is the proposed contract item rate or EPC?	The contract is item rate based.
5.	Will there be Prequalification or Shortlisting for this procurement?	No pre-qualification/shortlisting is envisaged for this procurement.
6.	Will the Bidding Document be provided to only FDR bidders?	MCA-Nepal bidding documents are public documents accessible to everyone after official launching, upon request via email to MCANepalPA@dt-global.com


No.	Question	Response
7.	What is the tentative timeline for launching this procurement?	MCA-Nepal expects to launch this procurement during the third quarter 2024.
8.	When will be the finalization of the contract? What is the start date of this contract?	MCA-Nepal expects to launch this procurement during the third quarter 2024. The procurement process is expected to take between 4 to 6 months; construction time is 24 months from contract signing.
9.	How many contract packages or lots will be there?	There will be only one contract package.
10.	What is the qualification criteria for a firm to be a JV partner?	The Qualification and Evaluation Criteria will only be disclosed in the bidding document.
11.	What are the legal provisions for the taxes, customs, and duty?	As a general rule, MCC Funding is free from the payment or imposition of any taxes and that has been specifically governed by Section 2.8 of the Compact read along with Annex VII Tax Schedules with detailed procedure on refunds/exemptions. Bidders are requested to go through these provisions to understand the tax implications on Contractors and Sub-Contractors.
12.	The proposed road has a relatively small stretch of only 40 km. There will be importing of specific construction equipment/plant to construction site in Nepal and also returning them back to India after the completion. Will there be the customs and duty charges applicable for the Contractor for importing and carrying back the equipment?	As a general rule, MCC Funding is free from the payment or imposition of any taxes and that has been specifically governed by Section 2.8 of the Compact read along with Annex VII Tax Schedules with detailed procedure on refunds/exemptions. Bidders are requested to go through these provisions to understand the tax implications on Contractors and Sub-Contractors.
13.	Could you please share the FWD analysis data or trial test pits report	This documentation will be included as an available download of information with the bid package – when that is made available. This will also include the data from the test pits and visual survey.


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	<p>including CBR of the existing road along with the visual inspection survey or NSV report (if any conducted) such as to gain insight into the existing pavement condition?</p>	<p>An extract from the design report is shown below – concerning the FWD.</p>  <p>Figure 4: Analysis based upon 1st FWD data set and associated pavement thicknesses</p>  <p>Figure 5: Analysis based on 2nd data set collected with FWD – Black line is running average of 5-data points</p> <p>From chainage, 693+000 to the western end of the project 300mm will be used as the FDR design thickness whereas 250mm will be used for the eastern portion.</p> <p>The variation of the material in the trial pits versus chainage is shown below. The data suggests that no native soil will need to be incorporated.</p> 
14.	<p>Given that FDR surfaces are rigid in nature, there is a possibility of shrinkage cracks appearing on top of them, which will reflect onto the bituminous courses. How do we plan to</p>	<p>We had considered this in the design but the decision was made by the design team and MCA-Nepal to exclude a SAMI or crack relief layer from the design. Cracking with FDR style mixes is associated generally with stiff mixes and wide cracks forming due to thermal movements. For this site the design of the FDR layer with lower cement will tend to produce a mix which will develop fine cracks. Further, crack mitigation is considered by pre-cracking which will induce micro-cracking. The climatic range on this site is also substantially lower than many locations where this type of construction has been used. The use of fine mixtures for the base and wearing course which will use an elastomeric modified binder that will also reduce the tendency for crack propagation on this site.</p>

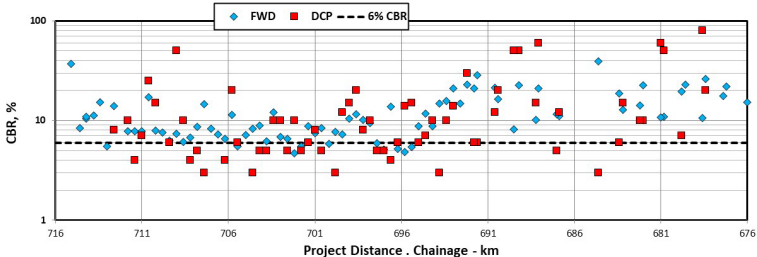
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	address this issue, especially considering that the presented cross-section lacks SAMI or Crack Relief Layer?	
15.	Is it compulsory to use chemical additives along with cement for the FDR? If so, what are the criteria for the chemical additives?	No.
16.	Which standards will be applicable during the design and construction of FDR: ASTM, IRC, or Nepalese standards? Could you please outline the required criteria in terms of UCS, flexural strength, residual strength, and durability?	<p>An extract from the draft specification document details this – see below</p> <p>Full-depth reclamation (FDR) with cement, shall consist of pulverizing and mixing existing asphalt pavement, base course and sub-base materials with Portland cement, and water to produce a dense, hard, cement-treated base in accordance with the procedures detailed in the Portland Cement Manufactures Association “Guide to Full-Depth Reclamation (FDR) with Cement. This document shall apply for the construction, except as noted in the provisions within this section of the specification. It shall be proportioned, mixed, placed, compacted, and cured in accordance with this specification, and shall conform to the lines and grades shown in the plan.</p> <p>(2) Material</p> <p>(a) Recycled Asphalt Pavement (RAP) and Base Material</p> <p>The Recycled Asphalt Pavement (RAP) and Base Material shall consist of the existing asphalt pavement, existing base course material, and/or subgrade material. The base course and subgrade material shall not contain roots, topsoil, or any material deleterious to its reaction with cement. Additional crushed rock shall be incorporated as necessary to allow the grades on the construction drawings to be maintained. When new material is incorporated this shall be mixed with the recycled material to produce a uniform homogeneous material across the width of the highway being recycled. The Contractor shall submit a method statement to ensure homogeneous mixing a minimum of 15-days before work commences on the aspect. The particle distribution of the processed material shall be such that 100% passes a 75mm sieve, at least 95% passes a 53mm sieve, at least 55% passes a 4.75mm sieve, and maximum 20% passes a 75-micron sieve. Over-sized material in the existing base shall not be incorporated and this is expected to be less than 1% of the overall material being stabilized on this project.</p> <p>(i) Mix Design</p> <p>The Contractor shall remove samples of RAP, base and sub-base material to the specified depth and perform appropriate testing to establish mix design. The mix design shall be submitted to the Engineer for approval</p>

No.	Question	Response
		<p>fifteen working days one week before the planned start of work. Approval of the mix design by the Engineer is solely for monitoring quality control and in no way releases the Contractor from their responsibilities.</p> <p>(ii) Mix Design Development Mix Design Development - Samples shall be obtained inclusive of the full depth to be recycled. The Contractor shall use a 300 x 300 x 300 mm excavation to closely simulate field conditions. A Qualified Technical Representative will analyse the samples and provide the following information as part of the mix design to the Engineer:</p> <ul style="list-style-type: none"> ○ Location of samples. ○ Thickness and description of existing pavement and aggregate layers to be reclaimed. ○ A selected matrix of soils testing standards (performed on mixed sample, except ASTM D2166.) ○ Moisture Content ASTM D2216 ○ Particle Size Analysis of Soils ASTM D422 ○ Liquid Limit ASTM D4318 ○ Moisture Density ASTM D1557 ○ Compressive strength of soil-cement cylinders (UCS) ASTM D16363 ○ Indirect Tensile (IDT) Strength of Asphalt Mixtures ASTM D 6931 <p>The resulting design shall have properties as follows:</p> <ul style="list-style-type: none"> ○ Compressive strength 2100 to 2800 kPa, 7-day strength ○ Indirect Tensile Strength 350 kPa, 7-day strength ○ All strength tests shall be conducted in triplicate. Any result that deviates by more than 10% from the average shall be discarded. A valid result shall be the mean of a minimum of two test results. <p>(b) Cement The cement shall comply with the requirements of IS: 269, 455 and 1489.</p> <p>(c) Water The water shall be free from substances detrimental to the curing of the cement-treated material.</p>
17.	<p>The quality of the existing road will significantly impact the quality of the FDR, particularly in terms of gradation since FDR involves stabilizing existing surfaces, additional aggregate will be required to meet the gradation requirement. Are there specific requirements</p>	<p>Some additional materials will be needed for the FDR stabilization on shoulder locations. These will be crushed rock – most likely from river deposits that exist mid-way on the road project. Some materials will be available from the existing width to be used on the shoulders since the vertical elevation is not being increased (except locally for smoothness).</p>

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	<p>for gradation criteria, as additional aggregate may be required to meet the gradation requirement? Further the road is to be widened, so during the FDR additional aggregate material will be required. Is there provision for the same?</p>	
18.	<p>Given the plan to use PG 76-22 [H] grade bitumen for Bituminous Courses, ensuring quality control during manufacturing and transportation is crucial. Since Nepal lacks refineries producing PG binder, it needs to be imported from Indian refineries or manufacturers. However, this may lead to polymer settling during transportation due to the long lead time. Additionally, maintaining the required temperature during transportation could be challenging, as frequent reheating can deteriorate the binder properties. So, is site blending of the PG bitumen permitted at the site?</p>	<p>Two options exist for the contractor – 1) obtain the material and hot transport from India (if available) or 2) mix on site. If mixing is done on site, then typically a contractor will make use of equipment of the style/example shown below. If the contractor manufactures, then he will be required to certify that the product conforms and a binder laboratory will need to be fully equipped. If material is supplied then some binder equipment will be required but to a lesser extent. Technicians will need to be certified in this type of testing.</p> <div style="display: flex; align-items: center;">  <div style="margin-left: 20px;"> <ul style="list-style-type: none"> ▶ Tanks have agitation ▶ After mixing – material sent to tanks for overnight period </div> </div>
19.	<p>Considering that the design for the</p>	<p>A typical abstract from the design report and investigation is shown below. Our testing and inspection of the facilities just south of Bhaluwang is in the design</p>

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	<p>bituminous courses must be conducted using the SuperPave method, the quality of aggregate becomes crucial to meet the required parameters. This necessitates sourcing high-quality aggregate, typically mined and crushed using a three-stage crushing process involving Jaw-Cone-VSI crushers. Since it's specified that aggregate must be sourced from approved mines, could you please provide details on the properties of aggregate tested during the survey and share the list of approved mines?</p>	<p>report and indicates that these aggregates can be used for Superpave construction. The contractor must satisfy the requirements in the specification and will need to enter into relationships with aggregate suppliers and/or obtain sources for use on this project.</p> <p>Project: East-West Highway - Dhan Khola Lamahi Road Section (DLRS)Pavement Client: MCA Nepal Sample: Crushed Aggregate for source material study</p> <table border="1" data-bbox="586 478 1523 621"> <thead> <tr> <th rowspan="2">S.N</th> <th rowspan="2">Query</th> <th rowspan="2">Source</th> <th colspan="3">Sieve Analysis</th> <th rowspan="2">Specific gravity</th> <th rowspan="2">Water absorption (%)</th> <th rowspan="2">FI(%)</th> <th rowspan="2">AIV(%)</th> <th rowspan="2">ACV(%)</th> <th rowspan="2">LAA(%)</th> <th rowspan="2">SSS(%)</th> </tr> <tr> <th>G(%)</th> <th>S(%)</th> <th>C(%)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Saptarishi Crusher</td> <td>Rapti river</td> <td>99.65</td> <td>0.13</td> <td>0.22</td> <td>2.689</td> <td>0.84</td> <td>25.18</td> <td>20.03</td> <td>23.55</td> <td>28.58</td> <td>3.8</td> </tr> <tr> <td>2</td> <td>K.B.G Crusher</td> <td>Rapti river</td> <td>99.58</td> <td>0.22</td> <td>0.20</td> <td>2.687</td> <td>0.82</td> <td>24.06</td> <td>19.56</td> <td>23.33</td> <td>28.4</td> <td>3.0</td> </tr> <tr> <td>3</td> <td>Om Nama Shivaya Crusher</td> <td>Rapti river</td> <td>99.84</td> <td>0.05</td> <td>0.11</td> <td>2.697</td> <td>0.78</td> <td>24.11</td> <td>20.5</td> <td>23.4</td> <td>28.17</td> <td>3.3</td> </tr> </tbody> </table> <p>FI-Flakiness index AIV-Aggregate Impact value ACV- Aggregate crushing value LAA-Los Angeles Abrasion Test SSS-Sodium Sulphate Soundness G-Gravel S-Sand C-Clay</p> 	S.N	Query	Source	Sieve Analysis			Specific gravity	Water absorption (%)	FI(%)	AIV(%)	ACV(%)	LAA(%)	SSS(%)	G(%)	S(%)	C(%)	1	Saptarishi Crusher	Rapti river	99.65	0.13	0.22	2.689	0.84	25.18	20.03	23.55	28.58	3.8	2	K.B.G Crusher	Rapti river	99.58	0.22	0.20	2.687	0.82	24.06	19.56	23.33	28.4	3.0	3	Om Nama Shivaya Crusher	Rapti river	99.84	0.05	0.11	2.697	0.78	24.11	20.5	23.4	28.17	3.3
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20.	<p>Expanding the existing road to 12 meters, with 7.5+2.5+2.5-meter sections, while leaving the bridges unchanged will create potential traffic convergence points that could become accident-prone areas during both execution and when opened to traffic. What measures are planned to mitigate these risks? Could you please share the Traffic Management Plan (TMP) or Diversion</p>	<p>The contractor will be responsible for providing a traffic management plan as part of the contract execution. Traffic calming measures will be provided at bridges as part of the specification and these are of sufficient width for two – way traffic flow. Some deck and other repairs will necessitate some restrictions for short periods of time.</p>																																																							

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	plan for these locations?																																																								
21.	Since no rutting is reported in the existing road, why is the FDR proposed for this section, why not Bitumen Emulsion?	FDR with cement makes maximum use of local resources. A cement factory exists at about the half way point of the project. For economic reasons this is considered preferable.																																																							
22.	As we are not aware of the previous construction material used in the existing road and its strength, any pavement design restriction in case of FDR? IRC or NS or ASTM? Does it comply with parameter in terms of gradation? What are the strength parameters to be attained?	See detail in question 13 and 16 response.																																																							
23.	In Nepal, the aggregates are generally the river bed materials which are sedimentary in nature having high AIV value. While for superpave, aggregates with lower AIV value are required. How will this requirement be achieved?	<p>See Q19 response</p> <p>A typical abstract from the design report and investigation is shown below. Our testing and inspection of the facilities just south of Bhaluwang is in the design report and indicates that these aggregates can be used for Superpave construction. The contractor must satisfy the requirements in the specification and will need to enter into relationships with aggregate suppliers and/or obtain sources for use on this project.</p> <p>Project: East-West Highway - Dhan Khola Lamahi Road Section (DLRS) Pavement Client: MCA Nepal Sample: Crushed Aggregate for source material study</p> <table border="1"> <thead> <tr> <th rowspan="2">S.N</th> <th rowspan="2">Query</th> <th rowspan="2">Source</th> <th colspan="3">Sieve Analysis</th> <th rowspan="2">Specific gravity</th> <th rowspan="2">Water absorption (%)</th> <th rowspan="2">FI(%)</th> <th rowspan="2">AIV(%)</th> <th rowspan="2">ACV(%)</th> <th rowspan="2">LAA(%)</th> <th rowspan="2">SSS(%)</th> </tr> <tr> <th>G(%)</th> <th>S(%)</th> <th>C(%)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Saptarishi Crusher</td> <td>Rapti river</td> <td>99.65</td> <td>0.13</td> <td>0.22</td> <td>2.689</td> <td>0.84</td> <td>25.18</td> <td>20.03</td> <td>23.55</td> <td>28.58</td> <td>3.8</td> </tr> <tr> <td>2</td> <td>K.B.G Crusher</td> <td>Rapti river</td> <td>99.58</td> <td>0.22</td> <td>0.20</td> <td>2.687</td> <td>0.82</td> <td>24.06</td> <td>19.56</td> <td>23.33</td> <td>28.4</td> <td>3.0</td> </tr> <tr> <td>3</td> <td>Om Nama Shivaya Crusher</td> <td>Rapti river</td> <td>99.84</td> <td>0.05</td> <td>0.11</td> <td>2.697</td> <td>0.78</td> <td>24.11</td> <td>20.5</td> <td>23.4</td> <td>28.17</td> <td>3.3</td> </tr> </tbody> </table> <p>FI-Flakiness index AIV-Aggregate Impact value ACV- Aggregate crushing value LAA-Los Angeles Abrasion Test SSS-Sodium Sulphate Soundness G-Gravel S-Sand C-Clay</p> 	S.N	Query	Source	Sieve Analysis			Specific gravity	Water absorption (%)	FI(%)	AIV(%)	ACV(%)	LAA(%)	SSS(%)	G(%)	S(%)	C(%)	1	Saptarishi Crusher	Rapti river	99.65	0.13	0.22	2.689	0.84	25.18	20.03	23.55	28.58	3.8	2	K.B.G Crusher	Rapti river	99.58	0.22	0.20	2.687	0.82	24.06	19.56	23.33	28.4	3.0	3	Om Nama Shivaya Crusher	Rapti river	99.84	0.05	0.11	2.697	0.78	24.11	20.5	23.4	28.17	3.3
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24.	What is the exact pavement depth that is going to be milled?	See Q13 response – when the pavement levels are consistent with the top surface the milling depth will be 400 on the western section and 350mm on the eastern section. This will vary a little in places where the vertical profile is corrected.
25.	What is the proposed pavement thickness?	400mm western part and 350mm eastern part. In all areas this is 100mm Superpave (60 asphalt base and 40 asphalt wearing) and the rest being FDR (300 or 250mm). See response to Q13 as this provides some extra information.
26.	For the widening part, and / or the Shoulders, would there be additional resources (aggregates) required?	Yes – additional fill and crushed stone will be needed.
27.	What is the MSA (Million Standard Axle) for this road section?	The design is based on a traffic flow which is around 30 million ESALs.
28.	Is the VE (value engineering) allowed? If yes, during which time?	Yes – but after contract award.
29.	What is the effective CBR of the existing surface?	<p>CBR was measured at various locations and also estimated from DCP and FWD data. Full information will be provided in the design report at bid stage. The figure below and the response to Q1 provide some preliminary information.</p>  <p>The figure is a scatter plot with a logarithmic y-axis labeled 'CBR, %' ranging from 1 to 100. The x-axis is labeled 'Project Distance . Chainage - km' and ranges from 716 to 676. A horizontal dashed line is drawn at approximately 6% CBR. Data points are represented by blue diamonds for FWD and red squares for DCP. Most data points are clustered between 10% and 30% CBR, with some outliers reaching up to 100% CBR. The legend indicates: FWD (blue diamond), DCP (red square), and 6% CBR (dashed line).</p>
30.	Any specific equipment (pre-defined list) mentioned?	<p>The text below is from the draft specification and supplies some guidance on this topic.</p> <p>(3) Equipment (a) Description</p> <p>FDR may be constructed with any machine or combination of machines that will produce a satisfactory product meeting the requirements for depth of pulverization, cement and water application, mixing, compacting, finishing, and curing, as provided in this specification.</p>

No.	Question	Response
		<p>(b) Mixing Methods</p> <p>Mixing shall be accomplished in place, using single-shaft or multiple-shaft mixers. Agricultural disks or motor graders are not acceptable mixing equipment. The equipment used to reclaim existing pavements shall be capable of pulverizing existing pavement, as well as any additional materials, to meet the gradation provided in the approved mix design, for the widths provided in the Plans, to the depth specified in the approved pavement design. Only self-propelled, rotary mixers/reclaimers shall be used.</p> <p>(c) Cement Proportioning</p> <p>Spreading of the cement shall be done with a spreader truck designed to spread dry particulate such as cement to insure a uniform distribution. Spreaders or distributors used shall be able to demonstrate a consistent and accurate application rate, as well as dust control during application. The mechanical cement spreader shall be capable of dispensing a measured quantity of cement +/- 1 kg per square meter in advance of the pulveriser just prior to each pass of the stabilizing operation. The pulveriser shall abut or slightly overlap (100mm) the previous pass to ensure a continuous homogeneous mass of granular material and cement. Transverse joints shall be overlapped to a minimum distance of 300mm. Cement spreader does not have to abut or overlap the previous pass as long as the calculated quantity of cement is dispersed in front of the pulveriser. The contractor shall verify the dosage rate shall be within 0.20 percentage points of the approved mix design.</p> <p>(4) Construction Requirement</p> <p>(a) General</p> <p>(i) Preparation</p> <p>Methods, equipment, tools, and any machinery to be used during construction shall be approved by the Engineer prior to the start of the project. Prior to the actual reclaiming of the roadway, drop inlets or catch basins that might be affected shall be sufficiently barricaded to prevent reclaimed subbase material, silt or runoff from plugging the drainage system.</p> <p>Sufficient surface drainage must be provided for each stage of construction so that ponding does not occur on the reclaimed sub-base course prior to the placement of bituminous concrete.</p> <p>Reclamation shall be accomplished by means of a self-propelled, traveling rotary reclaimer or equivalent machine capable of cutting through existing bituminous concrete pavement to depths of up to 375mm with one pass. The machine shall be equipped with an adjustable grading blade, leaving its path generally smooth for initial compaction.</p> <p>Equipment such as road planers or cold milling machines designed to mill or shred the existing bituminous concrete, rather than crush or fracture it, shall not be allowed.</p>

No.	Question	Response
		<p>Existing bituminous concrete pavement and any underlying granular material must be pulverized and mixed so as to form a homogenous mass of reclaimed sub-base material which will bond together when compacted.</p> <p>In areas where the vertical or horizontal geometry of the proposed roadway is different than that of the existing roadway, the roadway shall be reclaimed in-place and the reclaimed material sub-base placed in windrows or stockpiled while any filling or excavation is performed. When the proposed sub-grade elevation is achieved, the reclaimed sub-base material will be placed back onto the roadway in lifts no greater than 125mm in depth before being compacted.</p> <p>Reshaping using the reclaimed sub-base material should be minimized in order to ensure that the roadway has a uniform thickness of reclaimed sub-base material throughout. Unless otherwise specified, when reshaping of the roadway is required, it should be performed utilizing additional sub-base or processed aggregate base.</p> <p>The reclaimed sub-base material shall be compacted prior to the placement of any additional granular material (sub-base or processed aggregate base). Subsequent to the compaction of the reclaimed sub-base material, any reshaped material or additional material placed on the roadway should not exceed 125mm in depth before being compacted.</p> <p>A motor grader shall be used for shaping, fine grading, and finishing the surface of the reclaimed material or any other granular materials placed to form the surface prior to paving.</p> <p>Any surface irregularities which develop during or after the above-described work shall be corrected until it is brought to a firm and uniform surface satisfactory to the Engineer.</p> <p style="padding-left: 40px;">(ii) Mixing and placing</p> <p>FDR processing shall not commence when the materials to be stabilized, aggregate or sub-grade is frozen, or when the air temperature is below 4°C. Moisture in the base course material at the time of cement application shall not exceed the quantity that will permit a uniform and intimate mixture of the pulverized asphalt, base material and cement during mixing operations, and shall be within +/-2% of the optimum moisture content for the processed material at start of compaction.</p> <p>The operation of cement application, mixing, spreading, compacting, and finishing shall be continuous and completed within 2-hours from the start of mixing. Any processed material that has not been compacted and finished shall not be left undisturbed for longer than 30 minutes.</p> <p style="padding-left: 40px;">(iii) Scarifying</p> <p>Before cement is applied, additional pre-pulverization or scarification may be required to the full depth of mixing. Scarification or pre-pulverization is a requirement for the following conditions:</p>

No.	Question	Response
		<ul style="list-style-type: none"> • When the processed material is more than 3% above or below optimum moisture content. When the material is below optimum moisture content, water shall be added. The pre-pulverized material shall be sealed and properly drained at the end of the day or if rain is expected. • For slurry application of cement, initial scarification shall be done to provide a method to uniformly distribute the slurry over the processed material without excessive runoff or ponding. <p>(b) Application of Cement</p> <p>The specified quantity of cement shall be applied uniformly in a manner that minimizes dust and is satisfactory to the Engineer. If cement is applied as a slurry, the time from first contact of cement with water to application on the pulverized materials shall not exceed 60 minutes. The time from cement placement on the pulverized pavement to start of mixing shall not exceed 30 minutes.</p> <p>(c) Mixing</p> <p>Mixing shall begin as soon as possible after the cement has been spread and shall continue until a uniform mixture is produced. The mixed material shall meet the following gradation conditions:</p> <ul style="list-style-type: none"> (i) The final mixture (bituminous surface, granular base, and sub-base) shall be pulverized such that 100% passes the 75mm sieve, at least 95% passes the 53mm sieve, and at least 55% passes the 4.75mm sieve. Additional material can be added to the top or from the sub-base to improve the mixture gradation, as long as this material was included in the mixture design. (ii) The final pulverization test shall be made at the conclusion of mixing operations. Mixing shall be continued until the product is uniform in colour, meets particle size distribution requirements, and is at the required moisture content throughout. The entire operation of cement spreading, water application, and mixing shall result in a uniform pulverized asphalt, granular base, sub-base, cement, and water mixture for the full design depth and width. <p>(d) Compaction</p> <p>The processed material shall be uniformly compacted to a minimum of 95% of maximum density based on a moving average of five consecutive tests with no individual test below 94%.</p> <p>Field density of compacted material shall be determined using a calibrated nuclear density meter NDM. Optimum moisture and maximum density shall be determined prior to start of construction and also in the field during construction by a moisture-density test approved by the Engineer.</p>

No.	Question	Response
		<p>At the start of compaction, the moisture content shall be within +/-2% (see 4.1.2) of the specified optimum moisture. No section shall be left undisturbed for longer than 30 minutes during compaction operations. All compaction operations shall be completed within 2 hours from start of mixing.</p> <p>(e) Finishing</p> <p>As compaction nears completion, the surface of the FDR material shall be shaped to the specified lines, grades, and cross sections. The surface shall be constructed in a smooth manner such that deviations shall not exceed 12mm when evaluated with a 3.0-meter straight edge placed on the surface. If necessary or as required by the engineer, the surface shall be lightly scarified or broom-dragged to remove imprints left by equipment or to prevent compaction planes. Compaction shall then be continued until uniform and adequate density is obtained.</p> <p>During the finishing process the surface shall be kept moist by means of water spray devices that will not erode the surface. Compaction and finishing shall be done in such a manner as to produce a dense surface free of compaction planes, cracks, ridges, or loose material. All finishing operations shall be completed within 4 hours from start of mixing.</p> <p>(f) Curing</p> <p>Finished portions of the FDR base that are travelled on by equipment used in constructing an adjoining section shall be protected in such a manner as to prevent equipment from marring or damaging completed work.</p> <p>After completion of final finishing, the surface shall be cured by application of a bituminous prime coat (Clause 1302 of the Standard Specifications) or other approved sealing membrane. Curing material shall be applied as soon as possible, but not later than 24 hours after completing finishing operations. The surface shall be kept continuously moist prior to application of curing material. For bituminous curing material, the FDR base surface shall be dense, free of all loose and extraneous materials, and contain sufficient moisture to prevent excessive penetration of the bituminous material. The bituminous material shall be uniformly applied to the surface of the completed cement-treated material. The exact rate and temperature of application for complete coverage, without undue runoff, shall be specified by the Engineer.</p> <p>Should it be necessary for construction equipment or other traffic to use the bituminous- covered surface before the bituminous material has dried sufficiently to prevent pickup, sufficient sand cover shall be applied before such use.</p>
31.	Is CESHSM a separate BoQ item there?	Major work items for ESHSM requirements shall be kept as BoQ pay items. However, the finalization of BOQ items is in progress.

No.	Question	Response
32.	Who will be responsible for the required parameter of material to be passed for the stability of the finished road to have designed load? The existing material may be superior or inferior. if Inferior what will be the cost impact for the contractor?	The Contractor is responsible for meeting the strength parameters in the specifications. If these are not met, then the Contractor will conduct corrective actions at the Contractors expense.
33.	We do not know the quality of the existing material used by the previous contractor which might impact the strength parameter that needs to be attained, was this considered before?	See response to question 13 and following questions. Extensive trials pits demonstrate that stabilization of granular base and subbase materials combined with the existing asphalt layers will be needed. This information will be made available to those bidding on this contract.
34.	What is the pavement design code considered for this project?	Pavement design has been based upon layered elastic analysis and use of damaged transfer functions detailed in the Nepalese design guide which were taken from damage transfer function in the Indian method.