1.	Technology	**Building Products from Kotastone waste**
2.	Project team	Dr. Rajni Lakhani & Er. Rajesh Kumar
3.	IPR Status Patent	Indian Patent (under Process) **Title:** "An improved process of making cement concrete interlocking paver blocks using Kotastone slurry" (Patent application no. 0059NF2021, Filed in March' 2021).
4.	Application/ Uses/ Problem being addressed	**Application/Uses:** • Floor tiles- Light traffic loads & heavy traffic conditions • Paver blocks- Non traffic to Heavy traffic conditions • CFC blocks- Infill material & brick replacement **Problem Addressed:** The amount of wastes generated during cutting, querying, sawing and polishing processes from flaggy limestone industries easily reaches up to 10-12 MT per year. Flaggy limestone slurry consist of 85% water and 15% flaggy limestone powder. Thus, total solid waste generation easily reaches about 4.5-5 MT annually i.e. approx. 75-80% of total mined out reserves. It contains around 38% lime, 15-18% silica, 3-4% alumina and around 1-2% iron as FeO and Fe_2O_3. Thus, looking to such huge quantity of wastes as minerals or resources, there is a tremendous scope and need for recycling and using such stone wastes to develop sustainable building materials.
5.	Salient Technical Features including Competing Features	• Product : Floor-cum-wall Tiles, Paver & CFC Blocks • Size of Tiles & CFC Blocks (L*B*T) : 300* 300* 30 mm & 400*200*200 mm, respectively • Wet transverse strength (Tiles) : 3.50 - 5.54 MPa • Compressive strength (Cellular blocks) : 0.38-6.75 MPa • Grade & Thickness for Paver Blocks : M30 to M50 with thickness from 50mm to 100mm • No. of working days : 300 per annum • Land area required : Approx. 500 m^2 • Capacity : 5000 unit per day (Minimum) • Shift : 1 shift of 8 hours per day • Quality as per the standard specifications IS:1237, 15658
6.	Level/ Scale of Development	**The technology entitled, "Building Products using Kota Stone Waste" has been transferred to Rajasthan State Pollution Control Board, Jaipur on 08th Aug.'2017 for Rs. 20 Lakh.** Demonstration has been given successfully to a few Entrepreneurs on 1-2nd Nov. 2017 for implementation of technology. **India's first start-up plant for Low-grade limestone waste management; recognized by Central and State government (under Start-up Policy- 2017, Waste to Wealth and Swachh Bharat Abhiyan) was inaugurated on 16.06.2018. The plant has the capacity to manufacture 8,000 flooring tiles, 3,500 rough paver and 5,000 bricks**

		daily from the slurry. It can use up to 100 Ton Low-grade limestone waste per day.
7.	Environmental Considerations, If any	• Employment generation through setting up of industry • Minimization in environmental pollution • Saving of natural resources through waste utilization (Sustainable construction, green materials)
8.	Major Raw Materials to be Utilized	• Cement • Coarse and Fine aggregates (from Kota stone waste) • Admixtures • Pigment
9.	Major Plant Equipment and Machinery Required	Pan mixer, Pulverizer, foam generator, ribbon mixer, Molds etc.
10.	Techno- Economics (Broad)	As per the officials of 'Pashan welfare foundation, Kota'; since the inception of plant in Kota (date: 16.06.2018); total sales of interlocking paver blocks, tiles and bricks were 7,24,685 in numbers and supposed to be increased day-by-day. Profitability is ~35-45% as compared to market tiles, paver & CFC blocks; on Annual turnover. Till now, 'Pashan welfare foundation, Kota' have earned 25 to 35 % profit approx. on the developed products.
11.	Technology Package (IPR, Process etc.)	India's first start-up plant for Kotastone waste management; recognized by Central and State government (under Start-up Policy- 2017, Waste to Wealth and Swachh Bharat Abhiyan) was inaugurated by Sh. Gaurav Goyal Ji, IAS, Kota on 16.06.2018. The plant has the capacity to manufacture 8,000 flooring tiles, 3,500 rough paver and 5,000 bricks daily from the slurry. It can use up to 100 Ton Kotastone waste per day.  
12.	Photographs (please provide high quality photographs of proof of concept & validation)	Shown below-

Tiles, Paver blocks & Lightweight Blocks

Laying of Paver blocks in CSIR-CBRI

Signing of MoU between CSIR-CBRI and RSPCB, Jaipur officials