

## 1. Summary

### 1.1 Overview



This is the final report for the work done prior to the April-2015-earthquake and post-earthquake at **Shree Satdhara Lower Secondary school** located in Birkharka Village. Shree Satdhara is one of the three schools for which funds were requested from Eagle, as part of our reconstruction work after the earthquake. It is one of the fifteen schools that the Department of Education granted us permission to reconstruct.

We have been working closely with this school for several years. Prior to the earthquake, they requested help in constructing a school in a new location, as the original one was considered unsafe. They sought support from us to build nine classrooms (four new classrooms, in addition to the five old ones) while pointing out other needs such as a toilet building, playground, water supply, desks and books, among others.

We mentioned in our interim report that the project in Birkharka took a little longer to start due to an issue arising out of community dispute over land ownership. However, Nepal was struck by a massive earthquake before the task could be completed, which forced us to stop working on the project. In order to resume work, we made a fresh request to Eagle that took into account the new circumstances.

Before resuming reconstruction, we conducted a masonry training session in Kathmandu for over 50 locals from various villages, including Birkharka. The session was focused on teaching earthquake resistant construction techniques. After seven continuous months of hard work, we are pleased to report that we have completed the majority of the project. There are a few smaller elements that still need to be completed, including fencing, painting and the relocation of the drinking water taps, but these can be finished without any difficulty. However, during the undertaking of this project, we faced a multitude of challenges, which will be explained below.

### 1.2 Current situation of the school:

After 15 months of attending classes inside the Temporary Learning Centre, Birkharka children have now move into their newly constructed classrooms. The school teaches students from grades one through to six, has 113 students aged between 3 – 14, of which 57 are female and 46 are male. The school has five teachers, two supported by the government, two sponsored by us, and the fifth one is paid through contributions made by the community and VDC funds. There is a shortage of one teacher, but somehow the school is managing by multiple grade teaching and occasionally having volunteer teachers to cover classes, which we provide.



### 1.3 Aim

Our initial aim was to shift the school to a new location for safety purposes. The new location would give the school more space and was generally a better learning environment. As part of the move we also wanted to reduce overcrowding by constructing larger classrooms, increase sanitation levels by constructing a new toilet block, and equip the school with vital resources and teaching materials, such as books and desks.

However, after the earthquake, the construction and upgrading of classrooms to earthquake resistant models, compliant with government standards, became a matter of top priority for us.

### 1.4 Summary of results to date

In total, we have constructed nine classrooms in three separate buildings, a five-room toilet block, and one drinking water tap. We also supplied 10 sets of desks and benches, book grants and sports equipment for the school. Prior to this, levelling the ground was a major challenge as we had to both use an excavator machine for 10 days and the labour of a huge work force. **We are pleased to report that seven classrooms are now in use, so children have left behind the difficult days inside the Temporary Learning Centers.**

## 2. Implementation

The fuel crisis that hit Nepal between September 2015 and March 2016 was a challenge that we had not accounted for and was completely beyond our control. The background to the crisis was that four months after the earthquake Nepal's political parties promulgated its long awaited new constitution, but left a huge segment of the population -particularly those living in the southern belt of Nepal-discontented. The mishandling of this matter spilled over into diplomatic relations with India whose government stopped supplying fuel to Nepal. This caused the relationship between India and Nepal to reach an all-time low, which prolonged the fuel crisis till March 2016. The shortage of fuel badly affected all sectors, including construction in Nepal - our project was no exception. This factor led to a delay in launching the project until January 2016 when we started buying fuel off the black market.



The bureaucracy at the Department of Education was another major challenge we had to face. The Department took a long time to come up with any clear and simple plans for school building because of the unprecedented scale of the crisis it faced. We tried to get our designs approved, but they were sent from one office to another. Eventually, the Department of Education and Department of Building Codes made tougher regulations on the types of buildings that could be built, both in terms of size and quality. This meant

that we had to make some major modifications to our earlier designs, which massively increased the overall cost. Thankfully, we managed to secure additional funding not only for Birkharka, but also for a few other schools where we faced a similar situation.

The construction process was managed by a highly dedicated team, comprising our country manager and his local team at HELP, an engineer, architect and site supervisor, together with the school management committee.

As with all other schools, we trained locals from Birkharka to gain updated building work skills. A full time supervisor, government engineers, local masons and our local engineer were all recruited to oversee the building process. In March, we had a hand-over ceremony for a three room building and toilet block that had been completed, the event was attended by the local education authorities, Anthony Lurch, the engineer from the Department of Education, teachers, students and parents.

## 2.1 Classroom Construction

Our original proposal was to build nine rooms in a new location, of which four were to be newly constructed and the other five were to be built from the old building's materials. However, under the new building protocol, relocation of the five old classrooms was not acceptable, so we had to make modifications, resulting in an increase in the overall cost of the project. We had planned to use the stone, timber, doors, windows and roofing from the old building, but this was no longer deemed appropriate. We then went on to build three separate buildings: a three room stone masonry building, a four room brick masonry building, and a two room hollow concrete block building (for their appropriateness and mainly to keep the cost as low as possible). The description of each building type is explained below. Each of the building design has been approved by the Department of Education and they have been constructed to an earthquake resistant standard.



Please note that we built the stone masonry building because the stones were available and we were recommended by the local authorities to use local materials as much as possible as it would help transfer relevant knowledge to the villagers for when they build their own homes. We moved to brick masonry building when we saw that the stone masonry building method was taking a long time and also because the stones from the previous buildings were used up. The third building, which was built using hollow concrete blocks up to a plinth level and then walled with lightweight materials, was built to keep overall building costs low. This type of building is considered temporary compared to the other two, but is perfectly usable for at least 10 years. Whereas, the other two buildings are expected to last at least 30 years or even longer. Please do not be confused that anything built with hollow concrete blocks are to be considered temporary buildings. It is only because of the plan to use light weight material after three feet high concrete walls and that the trusses and frames were used from the Temporary Learning Centre, which means it does not quite meet the permanent school standard, however, the building is perfectly safe.

In each of these buildings, the foundations are deep and strong with concrete reinforcement. Seal and lintel bands above and below the doors provide standard seismic strength, the corner bands tie up the building joints and the walls attached to the roof have concrete beams, enabling the building to act as one unit.

Our overall expenditure on the classroom buildings was Rs. 4,303,500 or £28,500.

### 2.1.1. Stone masonry three room building (block I)



Out of the nine classrooms, the three rooms constructed in March are made from stone masonry and have been in use since then. In fact, this building turns out to be the first stone masonry prototype building in the region. A key feature of this building is that the roof has a south orientation, which allows heat to be absorbed during winter and for natural lighting. This building is a continuation of the building we were working on just after the quake, however with many modifications. We resumed work

on this building from mid-December 2015 and it was completed in March 2016. Anthony Lunch inaugurated the school and handed the classrooms to the school management committee at a function, which was also attended by 11 Loughborough University Students who had been helping with painting works.



Each room measures 14 feet by 15 feet and the total cost of construction for the three rooms was approximately Rs. 1,812,000 or £12,000. The cost per square feet came to approximately £19. These rooms have been in use since April.

### 2.1.2 Four room single story brick masonry building (block II)

After a month, towards the end of April, we began the construction of four more rooms, but this time with brick masonry. We completed the structural part of this building on the 25<sup>th</sup> of July and a few things are yet to be completed, such as the fitting of window shutters and painting. However, they are comparatively simple tasks and can be easily done.



For this building, we followed a standard government model that consists of metal frame with a set of roof trusses supported by metal poles that are fixed to the ground. The walls were made from brick masonry reinforced with horizontal bands.

Following suggestions from the Department of Education, we designed this building with a light weight partitioning method suitable for smaller schools, like Birkharka, and the size of each classroom is 13 by 16 feet. The lightweight construction is to be built using a wooden stud frame, using either timber panels available from the village or plywood/cement boards on both sides. In addition, we have improved the constructional features of the building by allowing space for concrete reinforcement around the poles, increasing the size and reinforcement of both plinth ring beams and roof ring beams, and providing additional horizontal corner ties, none of which are used in the old conventional design. (See pictures below). There are a few remaining tasks for this building, including the construction of the front corridor and a ramp, the installation of door/window shutters, installation of transparent sheets and installation of light weight partitions.

The cost of constructing this building was Rs. 1,736,500 or £11,500. The cost per square feet came to £18.5. This building has been in use from the 1<sup>st</sup> of August.

### 2.1.3 Two room hollow concrete block single story building: Admin Block



In parallel to the four room brick building, we constructed a two-room hollow concrete building, which is now almost complete apart from installing lightweight walls. We decided to go for hollow concrete blocks instead of stone or brick in order to keep the costs low, as well as to speed up the building process. Hollow concrete blocks are slightly cheaper than bricks as they are locally produced and there is no compromise with quality either. The metal trusses and roof for this building were used from

one of the Temporary Learning Centers. The walls use light-weight materials like cement boards, however the concrete block walls have been erected up to plinth level of four feet height from the DPC level (Damp Proof Concrete). We have done this because the building will be used as a library and for administration purpose and this method helped to control cost. The size of each room is 14 by 16 feet. The remaining tasks for this building are the provision of lightweight walling, the construction of an outdoor corridor and installation of door/window shutters (See pic above).

The cost for constructing this two room building was Rs. 755,000 or £5,000. The cost per square feet came to £7.5. This building will be used as soon as the walling materials are transported to the village and installed.

### 2.3 Drinking Water Supply

Due to the new location of the school, the need for a new drinking water supply was felt and this was our first priority. We completed this part of the project before the earthquake and it managed to withstand the disaster without any significant damage. It is now supplying water to the students in the school. We supplied 500 meters of durable water pipe and a water tank. We also built a reservoir at the water source. A temporary water tap point has been installed, but a more permanent and better one might be built near the toilet block for convenience. The cost of building water tap was £100



We spent a sum of Rs. 75,500 or £500 towards supplying drinking water materials.

### 2.4 Playground and fencing:



The construction of the new buildings took up most of the outside space, which could have been used for a playground. Therefore, we had to create a wider outside area so that the school could have a playground. In terms of the fencing work, it was felt that retaining walls were a bigger priority, so we used the funds allocated for fencing to construct walls to prevent the soil from eroding away from the school premises when there is heavy rain.

Last year, we contributed £300 towards levelling the ground, which only covered a small amount of the total cost, the rest was provided by the villagers. The remaining £700 has now been used for retaining walls. We shall address the fencing need in the future once resources are available, which we hope will be within a year.

The cost of leveling the playground and retaining walls was Rs. 150,000 or £1,000. We estimate that the cost of fencing will also come to at least £1,000.

### 2.5 Toilet Construction

We have constructed a toilet building with 5 cubicles using stone masonry for the foundation and hollow concrete blocks for the walls. It has light CGI roofing, plenty of ventilation and a good water supply in the toilet. A septic tank measuring 15 feet deep and 10 feet in diameter is constructed at the back of the toilet block. The construction method is the same as the reinforced stone masonry classroom building. The toilet block has separate cubicles for boys, girls and teachers. The construction was completed in March 2016 together with the first building.



The cost for the five room toilet building was Rs. 453,000 or £3,000.



## 2.6 Desks and benches:

We have supplied 20 sets of desks and benches along with planks to the school, which together with the 15 they already had, means that the school has a sufficient number for all its pupils.

The cost of desks and benches was £500.

## 2.7 Library books, sports and music equipment:



At the beginning of April, we sent roughly 200 library books to the school along with a new book rack. We have since sent a similar number of books to the school. On top of that, we have also recently paid for English course books for all the students. We will continue to upgrade their library in future. We have also supplied music and sports equipment, and several students will attend the Himalayan School Olympics event (organised by us) later this year.

The cost of supplying books for the library and a rack were £300. And, the cost of funding sports equipment was £300.

## 2.8 Nursery classroom management:

Now that the buildings are nearly finished, we will work with the school's management to set up a suitable nursery room during the Dasain holiday (October). Our plan is to install small benches and tables with carpet on the floor and also decorate the walls with drawings and paintings for small children. The materials for this item have been ordered, which will soon be ready for delivery as soon as the roads are cleared. The budget allocated for this is £400.

## 2.9 English teacher and teachers training:

We started making a contribution for the recruitment of an English teacher and an ECD teacher since November 2014. The teachers funded by us are Mr. Sunil Tamang, and Miss Maya Jyoti, both of whom are Birkharka locals. Several teachers from Birkharka have attended our previous teacher training, both in Kathmandu and in Helambu. We will continue to include them in our future training sessions to help them learn new teaching techniques and methods.



We contribute Rs. 12,000 or £80 a month towards the salaries of these two teachers.

## 3. Budget

S. No	Headings	Original plus additional funds £	Spent in £	Remarks
1	Classroom buildings (original budget was £8,000 for new classrooms and £2700 for shifting of old classrooms). Additional budgets were £3000 and £2500 on respective headings.	£16,200		Built 9 new rooms instead of four new and five shifting.
1.1	3 room stone masonry building		£12,000	
	4 room brick masonry building		£11,500	
	2 room hollow concrete block building		£5,000	
	<b>Total</b>	<b>£16,200</b>	<b>£28,500</b>	
3	Toilet Building (Original budget was £1500 and the additional budget was £500)	£1500+£500)= 2000	£3,000	Built slightly bigger toilet as per new design.

4	Drinking Water Supply (500 meter pipe and water tank)	£500	£500	
5	Playground and Retaining Wall	£1,000	£1,000	Funded retaining wall instead of fencing.
6	Desk and Benches (20* £25)	£250	£500	
7	Library Facilities	£300	£300	
8	Music and Sports Equipment	£300	£300	
9	ECD Classroom improvement	£400	£400	
10	Teachers Salaries (English teacher and ECD teacher)	£2,500	£1,500	
11	Teachers Training	£300	£300	
12	Engineering and Overseers	£500	£1,000	
12	Admin costs @10%	£1,775	£1,775	
	<b>Total</b>	<b>£26,025</b>	<b>£39,075</b>	

### Conclusion:

Firstly, we apologise for the delay in sending you this report, however, we are pleased to bring you this final report despite multiple challenges we have faced as explained earlier. The good news is that the new school is now functioning!

As you will note from the figures above, we had a huge budget overshoot. The overall overspend is £13,050, which does not yet include the cost of providing masonry training to 6 locals. This massive figure is mainly because of the new building standards introduced by the government, which we had to adhere to and make necessary modifications. It was also partly due to high prices we had to pay for materials during the fuel crisis. We were lucky in terms of being able to secure funds from MetLife Foundation for USD 25,000, which saved us from further delay and the danger of not being able to complete the project.

What this highlights is that the cost of undertaking a building project is now much higher than before: it would now cost at least £4,500 for the type of classrooms we built at Birkharka including its design and engineering costs. It would cost even more for other types of buildings, such as bigger classrooms for bigger schools and if the buildings are two-storeys. Unlike in the past, we now have to pay higher costs for procuring materials and also the labour costs have gone up.

As of the reporting date, access to Birkharka village is obstructed due to the monsoon, but we expect the road will resume in October to complete any remaining tasks. These include installation of windows and door shutters, painting and partitioning. We will send pictures upon completion.

**Anthony Lunch and Jimmy Lama**  
**05 August 2016**