

Ministry of Local Government, Rural Development and Cooperatives
The People's Republic of Bangladesh

**THE PROGRAMME FOR CONSTRUCTION OF
MULTIPURPOSE CYCLONE SHELTERS
IN THE AREA AFFECTED BY THE CYCLONE SIDR
IN
THE PEOPLE'S REPUBLIC OF BANGLADESH**

OUTLINE DESIGN STUDY

FINAL REPORT

JULY 2008

**JAPAN INTERNATIONAL COOPERATION AGENCY
YACHIYO ENGINEERING CO., LTD.**

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JR

08-099

PREFACE

In response to a request from the Government of Bangladesh, the Government of Japan decided to conduct an outline design study on the Programme for Construction of Multipurpose Cyclone Shelters in the Area affected by the Cyclone Sidr in the People's Republic of Bangladesh and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Bangladesh a study team from February 2008 to July 2008.

The team held discussions with the officials concerned of the Government of Bangladesh, and conducted a field study in the study area. After the team returned to Japan, further studies were made. Then, a mission was sent to Bangladesh in order to discuss a draft outline design, and as this result, the present report was finalized.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of Bangladesh for their close cooperation extended to the teams.

July, 2008

Masafumi Kuroki
Vice-President
Japan International Cooperation Agency

LETTER OF TRANSMITTAL

July, 2008

We are pleased to submit to you the outline design study report on the Programme for Construction of Multipurpose Cyclone Shelters in the Area affected by the Cyclone Sidr in the People's Republic of Bangladesh.

This study was conducted by Yachiyo Engineering Co., Ltd., under a contract to JICA, during the period from February, 2008 to July, 2008. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of Bangladesh and formulated the most appropriate outline design for the project under Japan's grant aid scheme.

Finally, we hope that this report will contribute to further promotion of the programme.

Very truly yours,

Naoyuki Minami

Project Manager,

Outline Design Study Team

on the Programme for Construction of
Multipurpose Cyclone Shelters in the Area
affected by the Cyclone Sidr in the People's
Republic of Bangladesh

Yachiyo Engineering Co., Ltd.

SUMMARY

(1) Overview of the Country

Bangladesh is located in the west of South Asia between north latitude 20°21"~26°38" and east longitude 88°01"~92°41"; it shares borders with India to the west and the north and with Myanmar to the southeast, while the southern side of the country faces onto the Bay of Bengal. The national land area is 147,570km² (1.8 times the size of Hokkaido) and the population is 144.3 million (according to the World Bank, 2006). The national land of Bangladesh consists of the world's largest delta formed by the three great rivers of the Ganges, Brahmaputra and Megna, and alluvial plains with elevation of no more than 9 m comprise 80% of the country. Almost all of the national land area is lowland with elevation of 10 m or less, and countless rivers and their tributaries run the length and breadth of the country.

According to the UNDP Human Development Index, Bangladesh is ranked 140th out of 177 countries (2005); per capita GNI is US\$480 (World Bank, 2006) and more than 50% of the population live on or below the poverty line, making Bangladesh one of the world's least less-developed countries. Concerning industrial structure, primary industry accounts for 19.5%, secondary industry for 28.1% and tertiary industry for 52.4% (World Bank 2006).

(2) Background of the Requested Project and Outline of Developments So Far

Cyclone Sidr, one of the largest cyclones ever recorded, made landfall in Bangladesh from November 15 to 16, 2007, causing damage in 30 out of the country's 64 districts. According to the announcement made by the Bangladeshi government on December 17 that year, the number of people affected by the cyclone was 8,920,000, the number of fatalities was 3,363, and 871 persons were recorded as missing. Damage was especially severe in the four districts (Pirojpur, Patuakhali, Bagerhat and Barguna) where the cyclone made landfall.

The Japan International Cooperation Agency (JICA) dispatched the Bangladesh Cyclone Disaster Reconstruction Needs Assessment Study Team from December 8 to December 18 to facilitate the smooth implementation of Grant Aid for Disaster Prevention and Reconstruction, and the Study Team gauged the extent of damage, confirmed medium and long-term needs concerning recovery and reconstruction, and examined the support (financial cooperation and technical cooperation) required in the recovery and reconstruction stage. Based on the results of the needs assessment, out of the medium and long-term support needs, there is an absolute deficiency in the number of cyclone shelters and, considering reports that many residents were unable to evacuate during Sidr too, this is the area that requires the highest priority support. In view of these circumstances, the Bangladeshi side issued a request to Japan for the construction of multi-purpose cyclone shelters,

etc. in the four districts (Pirojpur, Patuakhali, Bagerhat and Barguna) that were hardest hit.

(3) Outline of the Study Findings and Contents of the Project

In response to the request, the Government of Japan decided to implement an Outline Design Study on the Project for Construction of Multi-Purpose Cyclone Shelters in the Cyclone Sidr Affected Area (Grant Aid Program for Disaster Prevention and Reconstruction), and consigned implementation of this to JICA. The Outline Design Study Team was dispatched to Bangladesh from February to March 2008, during which time it held discussions with officials in the Bangladeshi government and implemented field surveys. Following its return to Japan, the Study Team continued its work, later returned to Bangladesh to explain and discuss the Draft Summary of the Outline Design Study, and compiled the results of this into the report in hand.

The Project aims to construct multi-purpose cyclone shelters (also combining primary school functions) in the four districts (Pirojpur, Patuakhali, Bagerhat and Barguna) that were hardest hit by Cyclone Sidr, thereby mitigating vulnerability to cyclone damage for citizens living in the said areas.

After the Outline Study Team returned to Japan, the basic components of the Project based on the site surveys and results of discussions with the Bangladeshi side were compiled as follows.

Outline of the Project Facilities (Architectural)

Type	Structural Particulars	Contents of Facilities	Total Building Area		
			1 block	Number of blocks	Total
Side corridor type	<ul style="list-style-type: none"> - Structure: reinforced concrete structure - Raised floor, 2-story, with attic - Walls: brick, mortar finish, painted - Floors: concrete, trowel finish - Sanitary installations : rainwater holding tank, septic tanks, infiltration pits - Deep well (schools that currently have no deep well and where aquifers of good water quality can be confirmed) 	3 classrooms, 1 teachers' room, 1 storeroom, men's and women's toilets	624.4	31	19,356.4 m ²
Central corridor type	Ditto	Ditto	554.2	7	3,879.4 m ²
Total				38	23,516.6 m ²

Outline of Project Facilities (Furniture, Wells)

Item	Structural Particulars	Contents of Facilities	Quantity	Remarks
Furniture	Student desk and chair: steel frame, plywood top Teacher's desk and chair: steel frame, plywood top Teacher's cabinet: steel	Student desk and chair Teacher's desk and chair Teacher's cabinet	2,388 sets 152 sets 38 sets	Assuming a standard classroom capacity of 40~46 students, 20 sets per classroom in schools with no more than 200 students, and 23 sets per classroom for schools with 201 students or more.
Wells	6 inch hand excavation; PVC pipe of 1.5 inch inner diameter, gravel packing, sealing, No. 6 hand pump	No.6 hand pump With deep well	16 sites	In the target areas, since there is no rock formation, hand excavation shall be adopted. Water pumped up by bucket will basically be pooled; pumping tests using a motorized pump cannot be performed. Only schools where good water quality (according to local deep well water quality data) have been selected, however, in the event where salt or arsenic, etc. are discovered in water quality inspections, the water will only be used for toilet flushing.

(4) Project Implementation Schedule and Cost Estimation

In the event where the Project is implemented under the Government of Japan's Grant Aid for Disaster Prevention and Reconstruction program, the rough project cost is estimated as 1 billion 178 million yen (958 million yen on the Japanese side and 220 million yen on the Bangladeshi side). The major scope of works on the Bangladeshi side will be preparation of the construction site, demolition and removal of obstructions, bearing of taxes, bearing of bank commission fees and so on, and the project implementation schedule from the tender to completion of works will be approximately 21 months.

(5) Verification of Project Validity

The organization within the Bangladeshi government responsible for the Project is the Ministry of Local Government, Rural Development & Cooperatives (MLGRD&C), while the implementing agency is the Local Government Engineering Department (LGED). However, following completion of the facilities, the Ministry of Finance, Ministry of Primary & Mass Education (MoPME) and its subordinate agency the Directorate of Primary Education (DPE) will be in charge of the operation and maintenance of facilities at normal times.

The LGED is a nationwide organization in charge of regional development works such as infrastructure development and construction of roads, government offices, public primary schools and cyclone shelters and so on; it has approximately 10,320 employees and possesses high technical capability and a good track record.

Meanwhile, the MoPME is in charge of compiling policy regarding primary education and mass education, while the DPE is responsible for practical affairs such as the operation and monitoring of primary schools. Since the constructed cyclone shelters will be utilized as education facilities (primary schools) at normal times, the DPE will basically be in charge of operation and maintenance. Moreover, LGED engineers on the upazila level will conduct regular monitoring to support the routine maintenance activities. However, when cyclones hit, school management committees and disaster prevention management committees established on each site under guidance by the DPE will take the initiative not only in maintaining the facilities but also taking various disaster prevention measures.

The Project entails the construction of multi-purpose cyclone shelters on existing primary school sites, and it is deemed that there will be no problems regarding the securing of staff and maintenance budget as indicated above and that the facilities will be properly operated following construction.

The major effects anticipated as a result of Project implementation are as follows.

1) Direct Effects

With the construction of 38 shelters under the Project, some 62,200 people living in target areas will be able to evacuate, and they will be able to lead their lives with peace of mind.

2) Indirect Effects

Classrooms that ensure safety in the event of disasters will be secured for 6,470 schoolchildren (7,870 children if pre-school children are included) attending 38 primary schools in the target areas. The number of children per classroom, including pre-school children, will be reduced from 57.5 to 33.1, thereby leading to improvement in the education environment.

Thus, since the Project can be expected to realize sufficient beneficial effects and will not entail any problems in maintenance, the implementation of the Project under grant aid of the Government of Japan is judged to be appropriate.

Moreover, in order to realize the more efficient and effective implementation of the Project, it is necessary to establish the operation and maintenance setup, secure and appropriately assign personnel without delay, and secure an appropriate budget for operation and maintenance.

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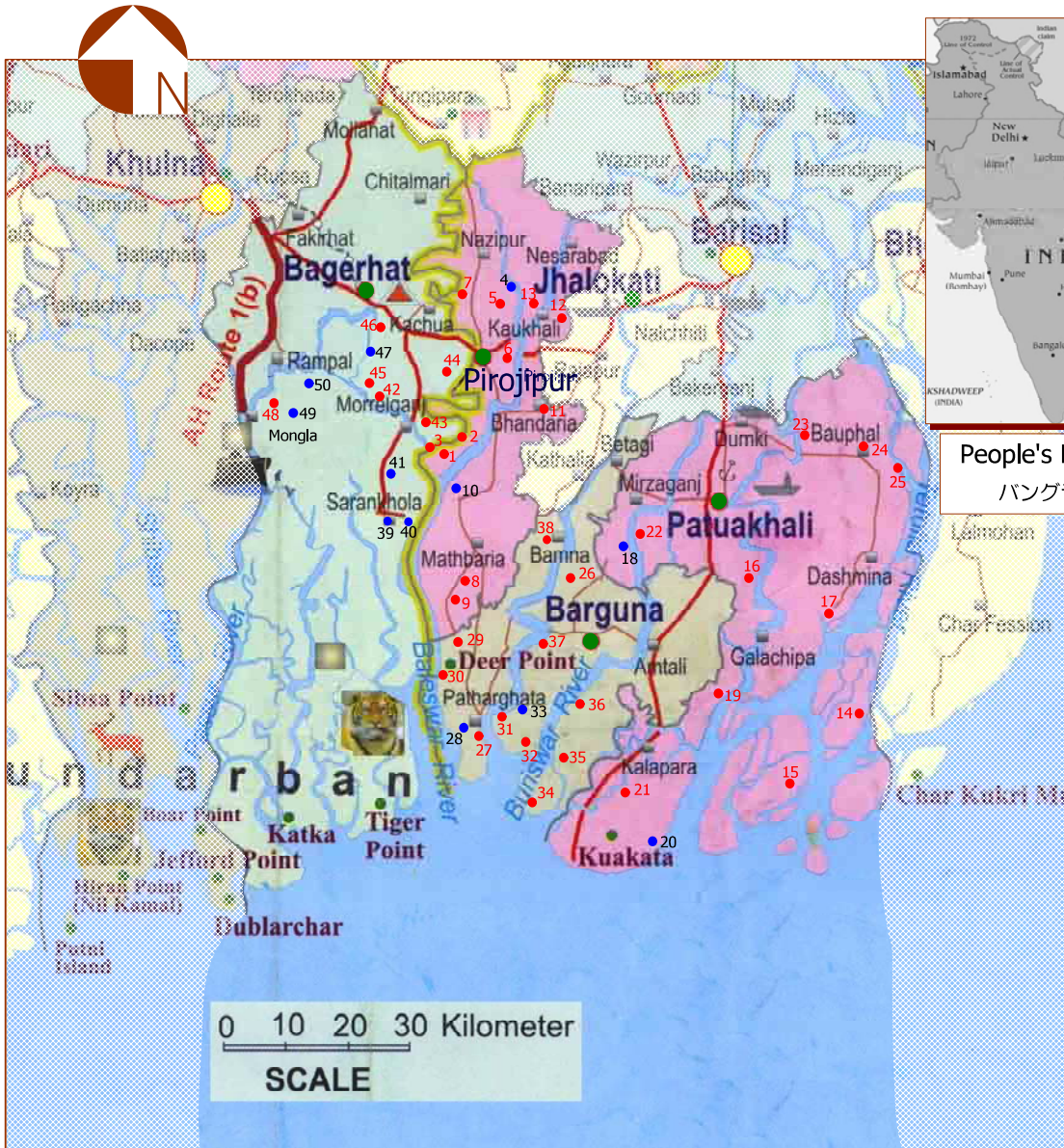
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People's Republic of Bangladesh
 বাংলাদেশ人民共和国

Pirojpur/ピロジプール

No.	Name of school / 学校名
1	A1 Badarpur Govt. Primary School / ボトルプール小学校
2	A2 Maddha Char Balashar G.P.S. / モッドチョルボレッシュョル小学校
3	A3 Pachim Kolaron G.P.S. / ポスティムコロン小学校
4	A4 Pantadubi-2 G.P.S. / ハンタドゥビ小学校
5	A5 Daudpur Chalbakuria G.P.S. / ダウプールチョルブクリア小学校
6	A6 Keshorota G.P.S. / ケッシュオロタ
7	A7 Jugkhola Muria G.P.S. / ジュッコラムリア小学校
8	A8 Kabaturkhali G.P.S. / コブトルカリ小学校
9	A9 Nali Charakgachia G.P.S. / ナリチョロゴクシア小学校
10	A10 32 No. Harinpala-2 G.P.S. / ハリンパラ-2小学校
11	A11 72 No. Uttar Purbo Bhandaria G.P.S. / ウットルブルボハンダリア小学校
12	A12 28 No. Choto Biraljuri G.P.S. / チョトビラルジュリ小学校
13	A13 14 No. Maddha Sonakur G.P.S. / モッドショナクル小学校

Barguna/ボルグナ

No.	Name of school / 学校名
26	C1 Gabtali G.P.S. / ガフトリ小学校
27	C2 27 No. Badurtala G.P.S. / バトルトラ小学校
28	C3 25 No. Simlatala G.P.S. / シムラトラ小学校
29	C4 56 No. Burjukpur G.P.S. / ブルジュップール小学校
30	C5 12 No. Sairabad G.P.S. / ライラバ小学校
31	C6 Nishanbaria G.P.S. / ニシャンバラ小学校
32	C7 Sonbunia G.P.S. / ソンブニア小学校
33	C8 Garjonbunia G.P.S. / ゴルジョンブニア小学校
34	C9 Sakhina G.P.S. / ソキナ小学校
35	C10 Satonpara G.P.S. / サトンパラ小学校
36	C11 Gabtali G.P.S. / ガフトリ小学校
37	C12 Baliataia G.P.S. / バリアタリ小学校
38	C13 Golaghata G.P.S. / ゴラガタ小学校

Patuakhali/ポトアカリ

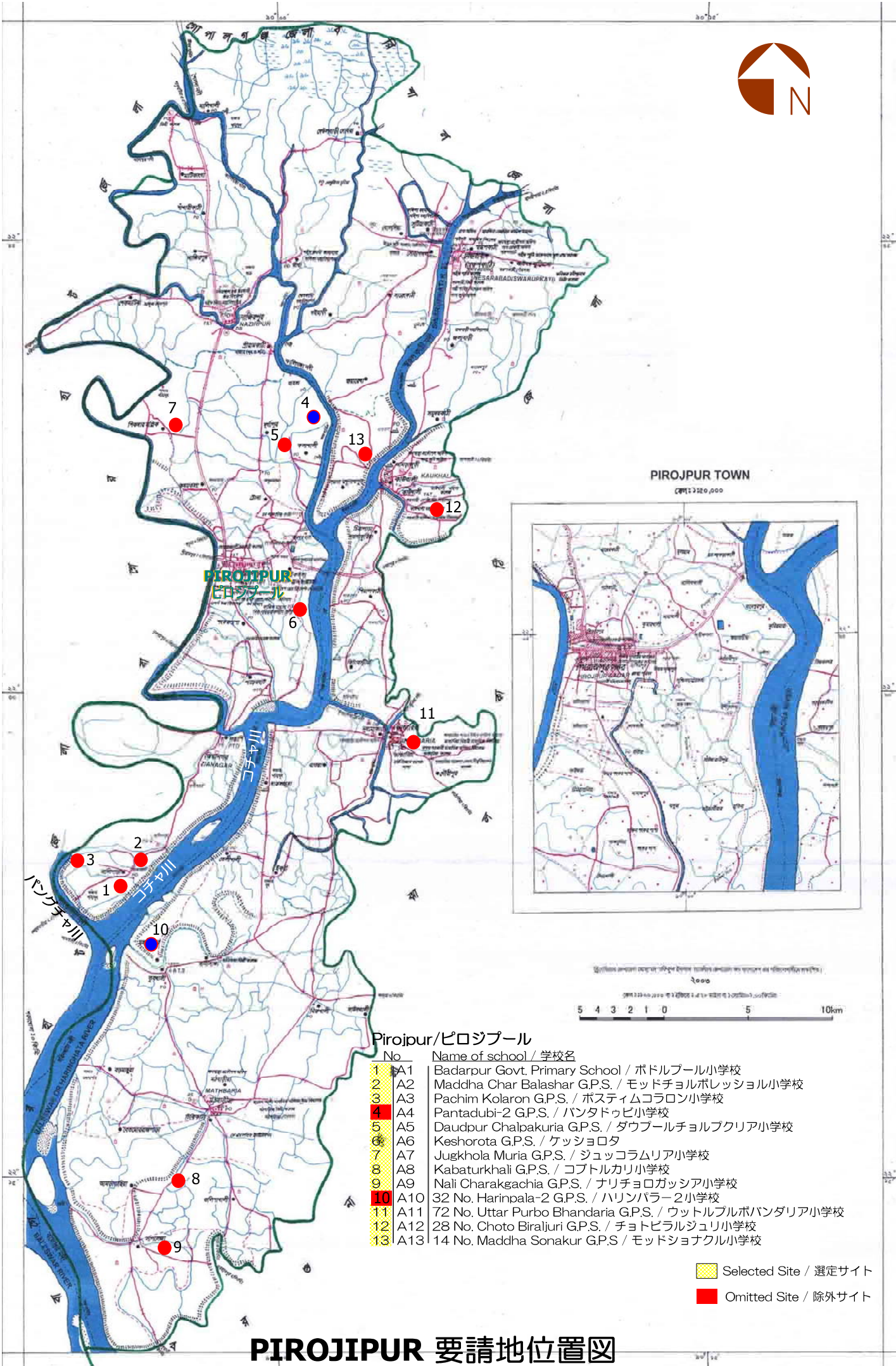
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16	B3 Purbo Char Bishaws G.P.S. / プルボチョルビッシュヤス小学校
17	B4 Patarchar G.P.S. / バタルチョル小学校
18	B5 Voyang G.P.S. / ボヤン小学校
19	B6 Uttar Debpur G.P.S. / ウットルデップル小学校
20	B7 Charchapoli G.P.S. / チョルチャポリ小学校
21	B8 Maherpur G.P.S. / マヘルプール小学校
22	B9 Mati Bhangra G.P.S. / マティバンガ小学校
23	B10 49 No. Kolta G.P.S. / コルタ小学校
24	B11 65 No. Purba Madonpura G.P.S. / プルバモドンブラ小学校
25	B12 Purba kalaiya G.P.S. / プルバカライヤ小学校

Bagerhat/バゲルハット

No.	Name of school / 学校名
39	D1 South Nalburnia G.P.S. / ドッケンノルブニア小学校
40	D2 B. Janerpar G.P.S. / ジャネルパール小学校
41	D3 B. Dhansagor G.P.S. / ダンサゴール小学校
42	D4 Sonakhali G.P.S. / ショナカリ小学校
43	D5 80 No. B. Pathtamara G.P.S. / バタマラ小学校
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46	D8 Bergazalia G.P.S. / バルガザリア小学校
47	D9 Aurjunbahar G.P.S. / オルジュンバハール小学校
48	D10 Chandpai G.P.S. / チャンパイ小学校
49	D11 Kasherdanga G.P.S. / カッセルダンガ小学校
50	D12 Dalipara G.P.S. / ダルバラ小学校

Selected Site / 選定サイト
 Omitted Site / 除外サイト

LOCATION MAP OF STUDY SITES
調査対象地位置図



Pirojpur/ピロジプール

No.	Name of school / 学校名
1	A1 Badarpur Govt. Primary School / ボドルプール小学校
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Omitted Site / 除外サイト

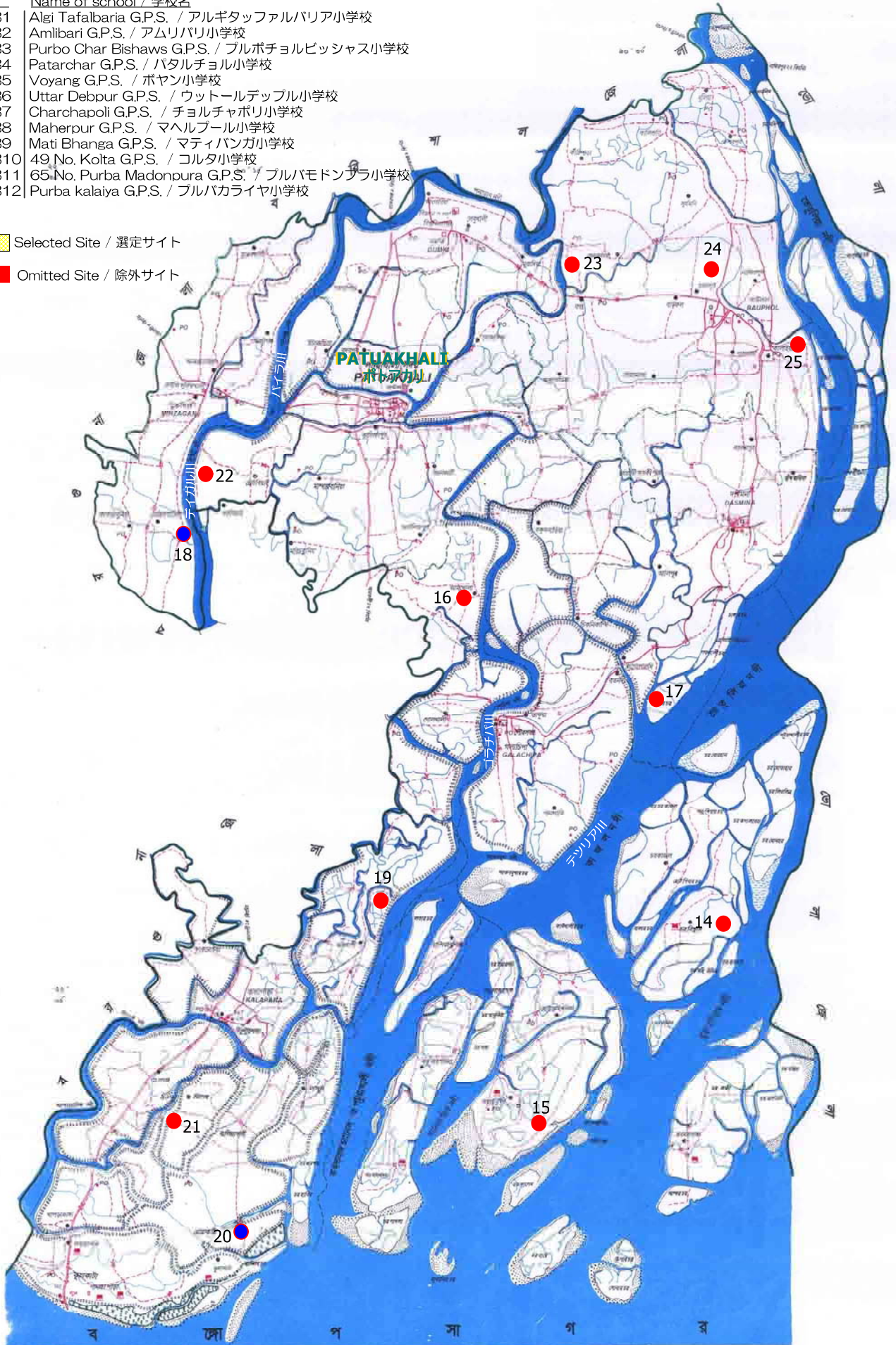
PIROJIPUR 要請地位置図

Patuakhali/ボトアカリ

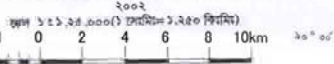
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উপস্থিত স্থানগুলি এছাড়াও অন্যান্য স্থানগুলি স্থানীয় সরকার কর্তৃক নির্ধারিত স্থানগুলি।



PATUAKHARI 要請地位置図

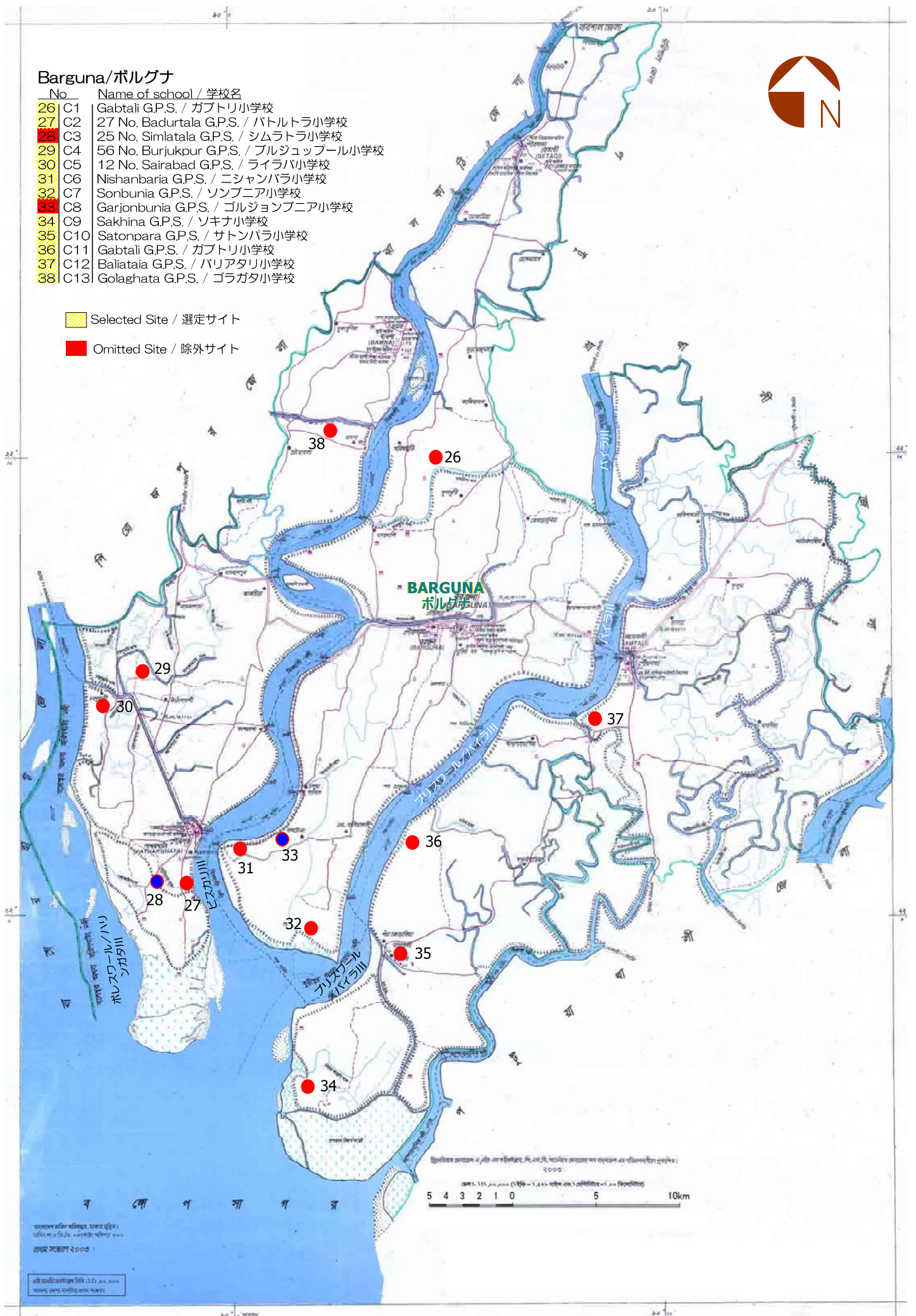


Barguna/ボルグナ

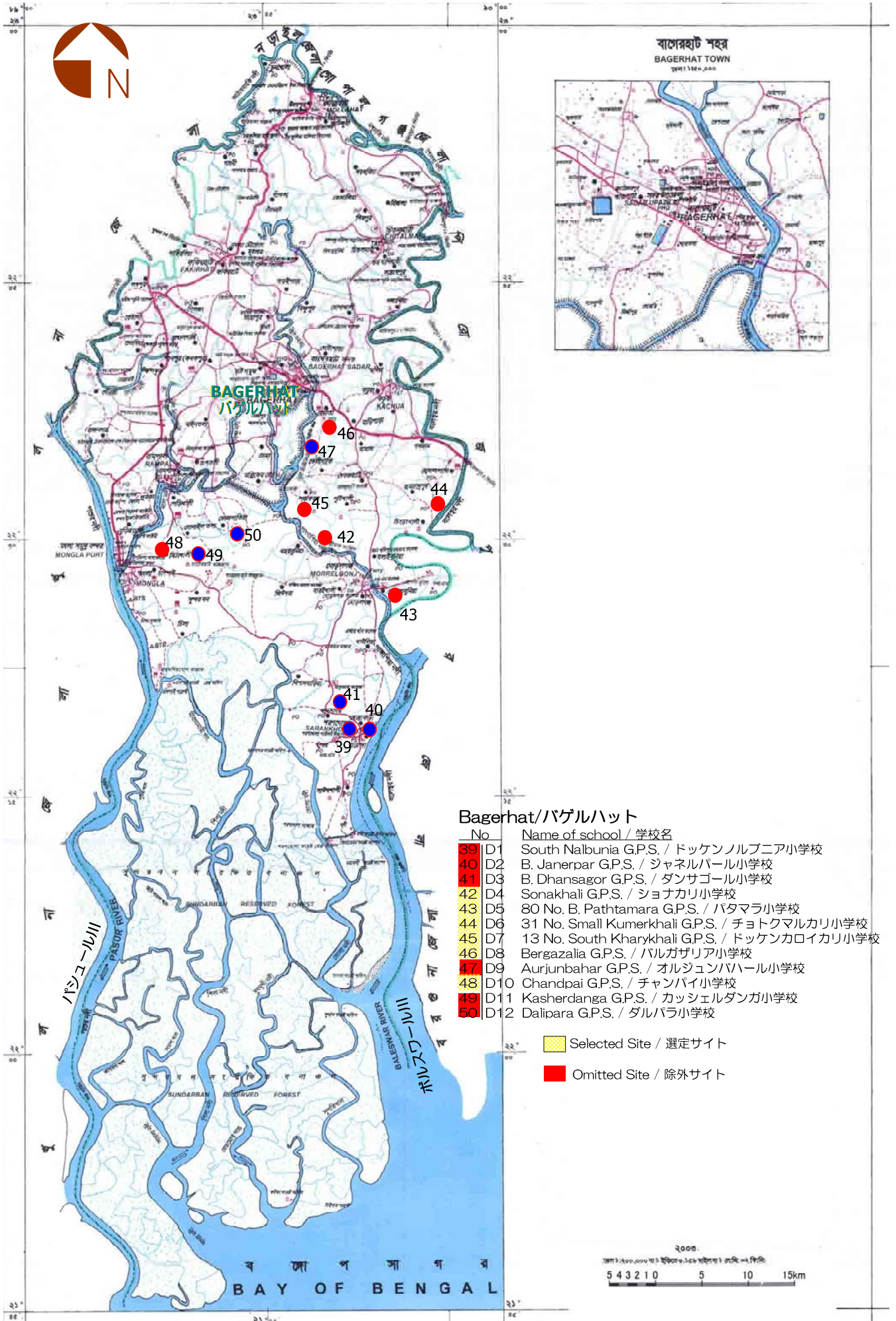
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BARGUNA 要請地位置図

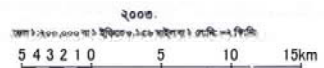


Bagerhat/バゲルハット

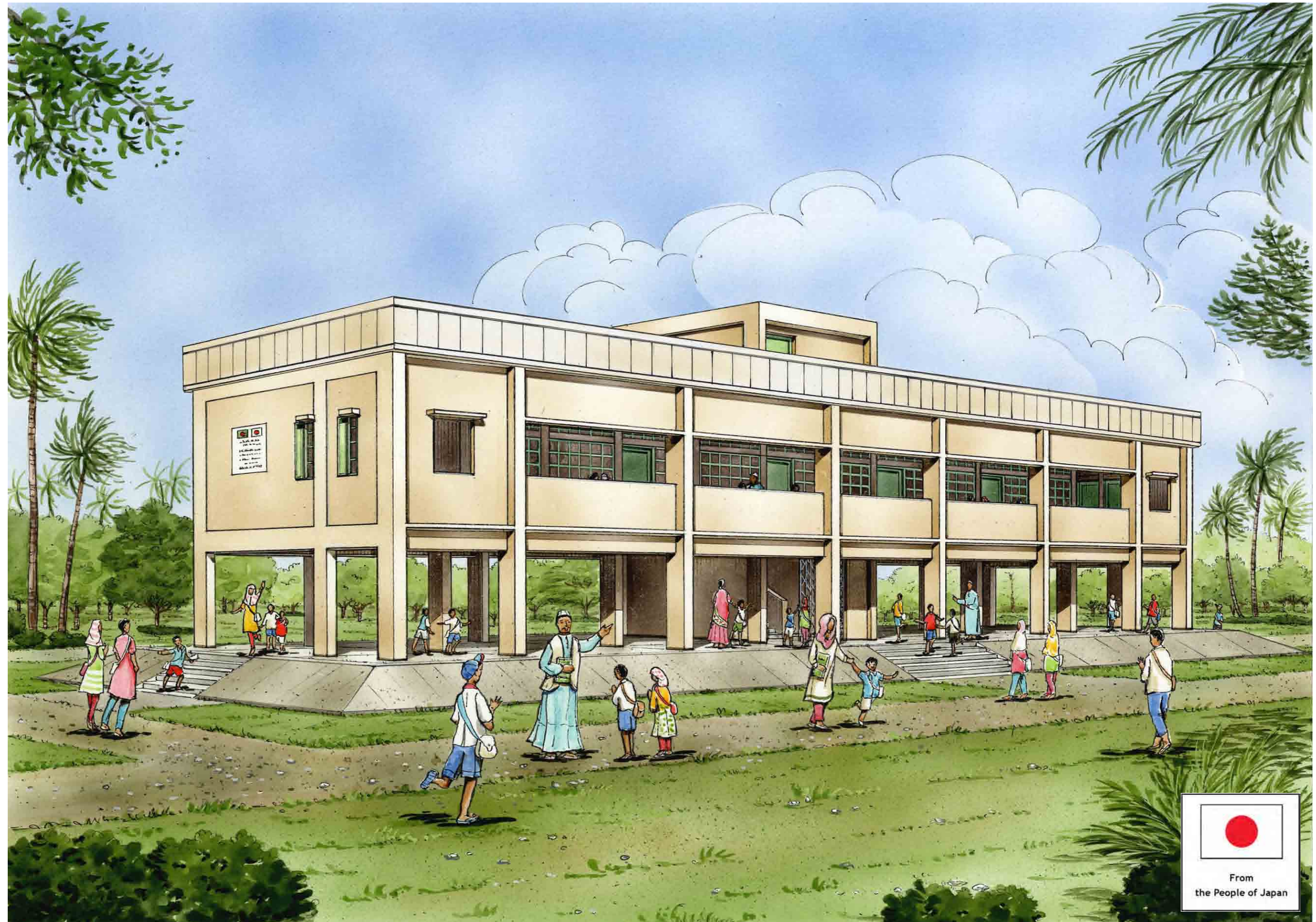
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BAGERUHAT 要請地位置図



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THE PROGRAMME FOR
CONSTRUCTION OF MULTIPURPOSE CYCLONE SHELTERS IN THE AREA AFFECTED BY THE CYCLONE SIDR
IN THE PEOPLE'S REPUBLIC OF BANGLADESH

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