ASCE
SUSTAINABLE SOLUTIONS
COMPETITION

ASCE STUDENT SYMPOSIUM
BANGLADESH 2026

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Buriganga Riverine Resilience Challenge

Hosted by

ASCE
STUDENT CHAPTER
Chittagong University of
Engineering & Technology

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SUSTAINABLE SOLUTIONS COMPETITION 2026

Buriganga Riverine Resilience Challenge

OFFICIAL RULES

Dhaka, Bangladesh • Buriganga River • DRRDA

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1. Mission and Background

1.1 Mission Statement

The International Sustainable Solutions Competition inspires undergraduate students to solve realistic civil and environmental engineering problems by developing knowledge in sustainable practices, on a platform that encourages technical rigor, creativity, and innovation. The competition challenges students to deliver outstanding sustainable solutions that integrate engineering and natural systems working in harmony for the benefit of communities.

1.2 Problem Statement

In 1610, a Mughal general named Islam Khan Chishti stood on the northern bank of a river and declared it the seat of an empire. He renamed the town Jahangirnagar, after his emperor, and within decades it had grown into one of the wealthiest cities on Earth, a metropolis of muslin so fine that legend called it "woven air," traded by boat down the very river now known as the Buriganga. Merchants from Amsterdam, Isfahan, and Canton anchored along its banks. Fortresses, gardens, and mosques rose along the water. For seventy-five years, the river was the reason an empire looked east.

That river is dying.

The Buriganga that once carried the wealth of Jahangirnagar to the world now carries the waste of a city it can no longer support. Untreated sewage from a riverside ward of roughly thirty thousand residents empties directly into the water. Decades of industrial effluent have driven oxygen levels so low that fish cannot survive in long stretches of the channel. Solid waste piles along a floodplain the river itself carved. The monsoon that once brought trade now brings floods the ward's aging drains cannot handle. Where Mughal barges once queued to load silk and muslin, the water today runs black, and residents plan their lives around which weeks it will flood.

The Dhaka Riverine Resilience & Development Authority (DRRDA) has been charged with redeveloping this ward, not merely as an engineering exercise, but as a reckoning with four centuries of history. The DRRDA's ambition is not to hide the river's past. It is to prove that the same waterway that built an empire can still build a future, with the ward's waste itself becoming the ward's power.

The DRRDA is requesting proposals for professional civil and environmental engineering services to redevelop this ward, centered on a new Sludge Treatment & Waste-to-Energy Facility sited along the Buriganga. The facility must treat the ward's wastewater and sludge, recover energy from what it processes, and return water to the river that is cleaner than what the ward has known in living memory. The DRRDA has adopted the Institute for Sustainable Infrastructure's Envision as the project's primary sustainability framework.

The central challenge is turning waste into power. The DRRDA desires a facility that captures biogas from sludge through anaerobic digestion and converts it to electricity and heat, offsetting as much of the ward's demand as possible. Teams must plan this facility fully: its process, its layout and structural arrangement, and how it will be built. The grid is unreliable, and the DRRDA sees on-site generation not as an amenity, but as an act of restitution, giving the ward back the self-sufficiency the river once provided by trade.

The facility does not stand alone. The site sits within a low-lying, flood-prone ward on the Buriganga's floodplain, near districts whose industrial past has left contamination in the riverbed

itself. A recent development on a neighboring parcel drew public concern over odor and flooding, and the DRRDA anticipates significant scrutiny from a community that has heard decades of unfulfilled promises to "save the river." Teams must therefore address the ward's flooding and stormwater, reduce the pollution flowing into the Buriganga, manage the district's solid waste, and integrate the new facility into the community it is meant to serve, with the same ambition that once made Jahangirnagar a capital worth naming.

Resilience and public trust are paramount. A facility that floods, fails, or offends its neighborhood is no solution at all, least of all on a river whose decline has already become a byword for failed restoration. The DRRDA seeks teams who can make waste, water, and energy work together for the people of this ward, and who can help the Buriganga reclaim something of what it was: not a liability the city endures, but a lifeline the city is proud of again.

The DRRDA is also seeking project names from teams at this time.

1.3 Problem Intent

The format of this competition is intended to simulate a request for proposal (RFP) that responds to a real-world challenge. A proposal is a document that clearly outlines a team's plan to reach an objective. Project owners often use proposals to competitively evaluate teams at the planning stage; the owner evaluates submissions to select a team for the project.

The parameters in these rules are intentionally broad to encourage creativity and resourcefulness. Teams are expected to use engineering judgment to make reasonable, justified assumptions in developing their designs.

2. Participation and Eligibility

2.1 Team Member Requirements

Team members must be undergraduate students enrolled during all or part of the current competition academic year. Graduate students are encouraged to serve as advisors. Teams are expected to reflect diversity, foster an inclusive culture, and treat everyone with dignity and respect.

2.2 Team Requirements

- Each team must have 2 to 5 undergraduate members.
- Each team must designate a team captain.
- There is no limit on the number of teams a single university may enter. Each team must register separately and will be assigned a unique team ID.
- All members of a team must be from the same university.

2.3 Level of Competition

The competition consists of a single round. Teams submit all required deliverables online before the deadline, and then present their proposals in person at the competition event. Judges score the submitted deliverables and the in-person presentation together to determine the final ranking.

2.4 Awards and Recognition

Awards will be presented to the top-ranking teams:

- 1st Place: Trophy + prize
- 2nd Place: Trophy + prize
- 3rd Place: Trophy + prize
- Fan Favorite (poster): Recognition

(Prize amounts to be finalized by the organizing committee.)

3. Conduct

3.1 Professionalism

This competition is to be conducted with the highest regard for ethical and professional responsibility. All participants shall act professionally and respectfully at all times. Inappropriate, uncooperative, or unethical behavior will not be tolerated and may result in sanctions or disqualification.

3.2 Plagiarism

The competition will not tolerate plagiarism of any kind, intentional or unintentional. No use of copyrighted or trademarked material is permitted without written authorization from the owner. Because multiple teams from the same university may compete, teams must ensure their work is independently developed. Submissions may be screened for plagiarism at the discretion of the judges. Plagiarism is grounds for disqualification.

3.3 Use of Artificial Intelligence

The committee neither encourages nor discourages the use of generative AI and natural language processing (NLP) tools in proposal development. However, teams must clearly cite any instance where AI/NLP was used to generate a substantially progressed product (generating outlines or grammar checks is not considered substantial progression). Failure to cite all such instances will be considered plagiarism. All AI/NLP use must additionally be documented in the AI Use Log (see Section 7).

3.4 Safety

Safety is the highest priority. All participants must comply with venue protocols and procedures. Organizers are empowered to stop any activity deemed hazardous.

4. Requests for Information (RFI)

Teams may submit Requests for Information (RFIs) through the official RFI form to clarify any part of the rules. Responses will be posted on the competition site and are considered part of the rules. Teams should regularly check for new RFI responses before submitting a question, as it may already have been answered. Based on RFIs, the committee may issue errata or addenda. Interpretation of unclear points, if not raised via RFI, is left to the judges and may result in deductions. “Ask, don't assume.”

5. Site Parameters

5.1 Site

The redevelopment site is a riverside urban area within **Dhaka City, Bangladesh, along the Buriganga River**. The site represents a low-lying, densely developed riverside area with significant exposure to river flooding, monsoon rainfall, inadequate drainage, wastewater pollution, and solid-waste accumulation.

Existing site drawings and a vicinity map are provided in **Appendix A**. The project site shall be interpreted within the geographic and environmental context of the Buriganga River and greater Dhaka metropolitan area.

5.2 Site Data

Parameter	Value
Redevelopment area	~108748624.5569 square ft.
Population served	~100,000 daily
Water demand	~15,000 m³/day (150 L/person/day)
Wastewater generation	~12,000m³/day
Average annual rainfall	~2,100 mm/yr
24-hr design storms	2-yr: 180 mm · 10-yr: 280 mm · 50-yr: 380 mm · 100-yr: 450 mm
Solid waste generation	~50 tonnes/day (0.5 kg/person/day)
Peak electrical demand	~45 to 60 MW
River water quality issues	Very high BOD/COD, high TSS, low DO, coliform contamination, heavy metals
Site context	Low-lying riverside urban area, flood-prone/floodplain influence, dense settlement, inadequate drainage, direct/indirect wastewater discharge to Buriganga

All measurements are in metric units.

5.3 Civil & Environmental Scope of Work

Teams must develop an integrated redevelopment proposal covering the following. The **central and most heavily weighted element is the Sludge Treatment & Waste-to-Energy Facility.**

1. Sludge Treatment & Waste-to-Energy Facility (central element)

- **Process Design**. A defined treatment train from collection through final disposition: preliminary/primary treatment → secondary treatment → sludge thickening → anaerobic digestion → biogas capture/conditioning → combined heat and power (CHP) generation. Each stage's design basis (loading rates, retention times, sizing) must be stated and justified against a recognized reference.
- **Facility Plan.** A general arrangement drawing showing unit locations, process flow direction, access/circulation, and a structural arrangement for major process buildings

(digesters, CHP building, control building). Detailed structural analysis is not required; a coherent, dimensioned facility layout is required.

- **Construction & Phasing Approach.** A narrative and/or schedule showing how the facility will be sequenced and built, including any phasing relative to the rest of the ward redevelopment, and how construction will avoid disrupting existing sewage flows or flood protection during the build.
- **Residuals Recovery**. A defined pathway for biosolids reuse (e.g., as fertilizer/soil amendment or construction material), including the treatment step (e.g., dewatering, stabilization) that makes the residuals suitable for that end use
- **Mass & Energy Balance**. A quantified balance showing sludge quantities in, biogas yield, and resulting electrical/thermal output, referenced to the site's population and wastewater generation rates

2. Water & Wastewater Infrastructure

- Water supply and distribution network for **~100,000 people (~15,000 m³/day)**.
- Wastewater collection and treatment for **~12,000 m³/day** to substantially reduce pollution entering the Buriganga.
- Reuse of treated water wherever technically and economically feasible.
- Reduction of **BOD, COD, TSS, nutrients, pathogens/coliforms, and heavy-metal contamination** in discharges.
- Prevention of untreated sewage and industrially contaminated flows from entering the Buriganga.

3. Flood & Stormwater Management

- Stormwater drainage and conveyance system for the redevelopment area.
- Flood protection for the site and proposed facility considering the **Buriganga floodplain and river-water-level conditions**.
- Nature-based solutions including retention/detention, constructed wetlands, bioswales, permeable surfaces, rain gardens, and green space.
- Pre- vs. post-development runoff and flood-extent analysis for the **2-year through 100-year design storms**.
- Post-development peak runoff should not exceed pre-development peak runoff unless a justified downstream capacity assessment demonstrates that the proposed discharge is acceptable.
- Consideration of backwater effects and river-stage interaction during major monsoon events.

4. Clean & Reliable Energy

- On-site renewable energy (solar PV, biogas from the facility).
- Demonstration of how much of the ward's demand is offset.
- Resilience, backup, and storage to address grid unreliability and load-shedding.
- Carbon Reduction

5. Site Planning & Integration

- Land use layout, roads and access, green space.

- Spatial analysis of existing conditions and land use.
- Site grading and earthwork (cut-fill) balance.
- Integration of all systems (systems approach) and community resilience.
- Public engagement and stakeholder strategy.

5.4 Geographic Basis

The competition site is based on the **Buriganga River in Dhaka, Bangladesh**, and teams shall develop their proposals using the geographic, climatic, hydrologic, environmental, and urban-development conditions of the Dhaka metropolitan area.

The **Dhaka Riverine Resilience & Development Authority (DRRDA)** is the project owner/client for the purposes of this competition.

Teams shall use **Bangladesh-relevant codes, standards, design manuals, regulations, and environmental requirements** wherever applicable. Where a Bangladesh-specific standard is unavailable or insufficient for a particular design component, teams may use internationally recognized standards and references, provided that their applicability is clearly stated and justified.

5.5 Additional Parameters

The committee will not provide additional site parameters. Teams are expected to make reasonable, justified assumptions for any parameters not specified.

6. Proposal Overview

The competition has four scored components:

- Technical Design Proposal: Section 7
- Sustainability: Section 8
- Poster: Section 9
- Interview: Section 10

Judges will assess proposals for completeness, technical justification, ingenuity, formatting, and sustainability.

7. Technical Design Proposal

7.1 Overview

Teams must submit a Technical Design Proposal that includes the following in order: Cover Sheet, Cover Letter, Project Approach, Team Organizational Chart, Preliminary Cost Estimate, and References. It must also include the following appendices:

Appendix A: Site Plan Exhibit; Appendix B: Sample Design Calculations; Appendix C: AI Use Log. No additional appendices are permitted.

7.2 Formatting

Page size 8.5×11 inches (A4 acceptable), minimum 0.5-inch margins. Body text in 11-point font, single spacing, in English, and searchable. Headings may use any legible font/size. No blank or separator pages.

7.3 Cover Sheet (1 page max)

Team name, university name, project name, and team member names.

7.4 Cover Letter (1 page max)

Brief project background and scope, highlights of the proposed design, and why the team should be selected. Must include university name, faculty advisor name, and a statement that the team has reviewed all RFIs and errata. Signed by the team captain.

7.5 Project Approach (6 pages max)

Should cover: key project and site features; the sludge-to-energy facility and its process; water and wastewater; flood and stormwater management; clean energy and resilience; solid waste; construction and planning approach; systems integration; and how the team will support public engagement.

The approach must demonstrate how the proposed systems respond to the **environmental, hydrologic, infrastructural, and community conditions of the Buriganga River and Dhaka**.

Teams must report their targeted Envision award level and justify it.

7.6 Team Organizational Chart (1 page max)

For each member: name, role, class standing, and years of competition experience. Supplemented by a team or individual photos.

7.7 Preliminary Cost Estimate (1 page max)

Tabular total construction cost estimate in a consistent currency, with columns for item description, quantity, unit, cost per unit, cost, and unit-price reference. Include a summarized total.

7.8 References

No page limit. Cost-estimate references are excluded from this section.

7.9 Site Plan Exhibit (1 page, 11×17 inches, Appendix A)

Must include project name, university name, client name, location, legend, scale bar, north arrow, plan view, and annotated site features (facility, buildings, roads, drainage, flood protection, energy/water infrastructure, and defining features).

7.10 Sample Design Calculations (4 pages max, Appendix B)

Legible, typed or scanned.

Calculations may include:

- Existing vs. proposed impervious area and runoff
- Site discharge
- Flood analysis
- River-stage/flood interaction where applicable
- Stormwater storage and conveyance
- Sludge quantities
- Biogas production and energy recovery
- Mass & energy balance
- Water demand and supply
- Wastewater treatment loading
- Treatment efficiency and pollutant reduction
- Earthwork balance
- CO_2 impacts
- Solid-waste quantities and management
- Calculations supporting sustainability features

Calculations shall use the **Buriganga/Dhaka site parameters provided in Section 5** and clearly identify any additional assumptions.

7.11 AI Use Log (Appendix C)

Tabular log of all substantial AI/NLP use, with columns for date, tool name, description of use, and estimated environmental impact (with a cited source and consistent metric). If no AI/NLP was used, state so. No page limit.

8. Sustainability

8.1 Overview

The project uses the ISI Envision (v3) framework. Teams must submit an Envision Checklist and an Envision Justification Document.

8.2 Envision Checklist

Teams complete the Envision (v3) Checklist reflecting their proposed design, determining applicability and level of achievement for each credit. Teams must not alter the structure of the checklist spreadsheet.

(Note: The organizing committee must obtain permission from the Institute for Sustainable Infrastructure for teams to use the Envision Checklist and Guidance Manual.)

8.3 Envision Justification Document (5 pages max)

A cover page (university name, team member names) plus a tabular summary of Envision credits by category and the resulting award level, and justifications for at least 2 credits per Envision category:

- Quality of Life
- Leadership

- Resource Allocation
- Natural World
- Climate & Resilience

Each justification must include the credit ID, credit title, points achieved / points possible, and sufficient support showing how the project meets the criteria.

9. Poster

9.1 Overview

Create a poster to inform the public of the project's sustainability features and benefits. It must be accessible and educational, and must include:

- Team name
- University name
- Project name
- Client: **Dhaka Riverine Resilience & Development Authority (DRRDA)**
- Location: **Dhaka, Bangladesh, Buriganga River**
- Annotated site plan
- Design inspiration
- Key design and sustainability features
- Sludge-to-energy process
- Flood and stormwater management strategy
- Water and wastewater strategy
- Energy strategy
- Benefits to the Buriganga and surrounding community

Maximum size **48 inches wide × 36 inches high**.

9.2 Display Session

Teams print and display their posters at the event at the designated time. Teams supply their own mounting materials unless the host specifies otherwise.

9.3 Fan Favorite

Attendees may vote for a “Fan Favorite” poster (voters may not vote for their own team; judges may not vote).

10. Interview

10.1 Interview Team

Each team must field a 2-to-5-member interview team of registered participants meeting Section 2.1.

10.2 Presentation

Teams present in English, professionally, as to a board of directors. A slide deck or visual aids are encouraged. Presentations may not exceed 7 minutes 5 seconds. Judges will cut off presentations longer than 10 minutes.

10.3 Question-and-Answer

A ~5-minute Q&A with the judges follows immediately. Questions come only from the judges.

11. Submissions

11.1 Registration / Intent Form

Teams must register and submit the Intent Form no later than September 5, 2026. Registration confirms intent to participate and acknowledges eligibility requirements.

11.2 Deliverables

Each team must submit:

1. Technical Design Proposal (PDF)
2. Envision Checklist (XLSX)
3. Envision Justification Document (PDF)
4. Poster (PDF)
5. AutoCAD DWG file (Plan & Elevation of the proposed water/wastewater treatment facility**)**)

Each deliverable is one combined file. All files except the 3-D model must be under 10 MB. No compressed folders.

Existing Site DWG File: The official site DWG file is available for download at the following link: SUSTAINABLE SOLUTION DWG FILE - Google Drive

File naming: University Name or Abbreviation Deliverable Name (e.g., Dhaka Tech Technical Design Proposal.pdf).

11.3 Deadlines

Milestone	Date
Rulebook published	August 22, 2026
Intent form opens	August 25, 2026
Intent form closes	September 10, 2026
RFI opens	September 11, 2026
Registration opens	October 5, 2026
RFI Closes	October 10, 2026
Registration closes	October 21, 2026
Deliverable submission deadline	October 22, 2026 (≈ 1 weeks before event)

Milestone	Date
Competition event (presentation + awards)	October 29 to 30, 2026

Time presented here as BST (Bangladesh Standard Time). Judges may refuse to review deliverables submitted more than 5 days late.

12. Scoring

12.1 Scoring Overview

Maximum proposal points per component:

Component	Points
Technical Design Proposal	40
Sustainability	20
Poster	15
Interview	25
Total	100

Judges score each component on a 100-point scale (raw score). Proposal points are then assigned proportional to the highest-scoring team in each component, rounded to the nearest 0.5. Component proposal points are summed for the total. In the event of a tie, the higher Sustainability score prevails.

12.2 Deductions

Deductions are applied to the relevant component's raw score for: missing required information; failure to follow formatting or submission requirements; and materials received past the deadline.

Interview deductions may apply for: interview team size outside the permitted range and presentation time exceeding the specified limit.

Submission-related deductions may also apply for failure to submit the required **AutoCAD DWG file**, submission of an incorrect or incomplete DWG file, failure to comply with the required file format or naming convention, or late submission of any required deliverable.

Deductions and their point values will be detailed in a deductions form provided to teams.

12.3 Appeals

Teams may appeal deductions to the Head Judge by the announced deadline. Appeals must concern only the appealing team. The Head Judge has final say.

13. Registration Fee

The registration fee for participation in the competition is as follows:

Participant Category	Fee per participant
Local Student (CUET)	**1000 BDT**
Local Student (not CUET)	**1200 BDT**
International Student	**20 USD**

14. Training and Resources

The committee will provide guidance on Envision (via ISI), AutoCAD DWG file, and past-submission examples for inspiration (not to be copied). Details to be announced.

15. Judge and Host Information

The organizing host secures a judging panel of 3 to 5 judges (including a Head Judge), with at least one judge experienced in site/environmental design and at least one well-versed in sustainability.

The judging panel should collectively have sufficient expertise to evaluate wastewater treatment, sludge management, waste-to-energy systems, flood and stormwater management, environmental engineering, sustainable infrastructure, and urban/site planning.

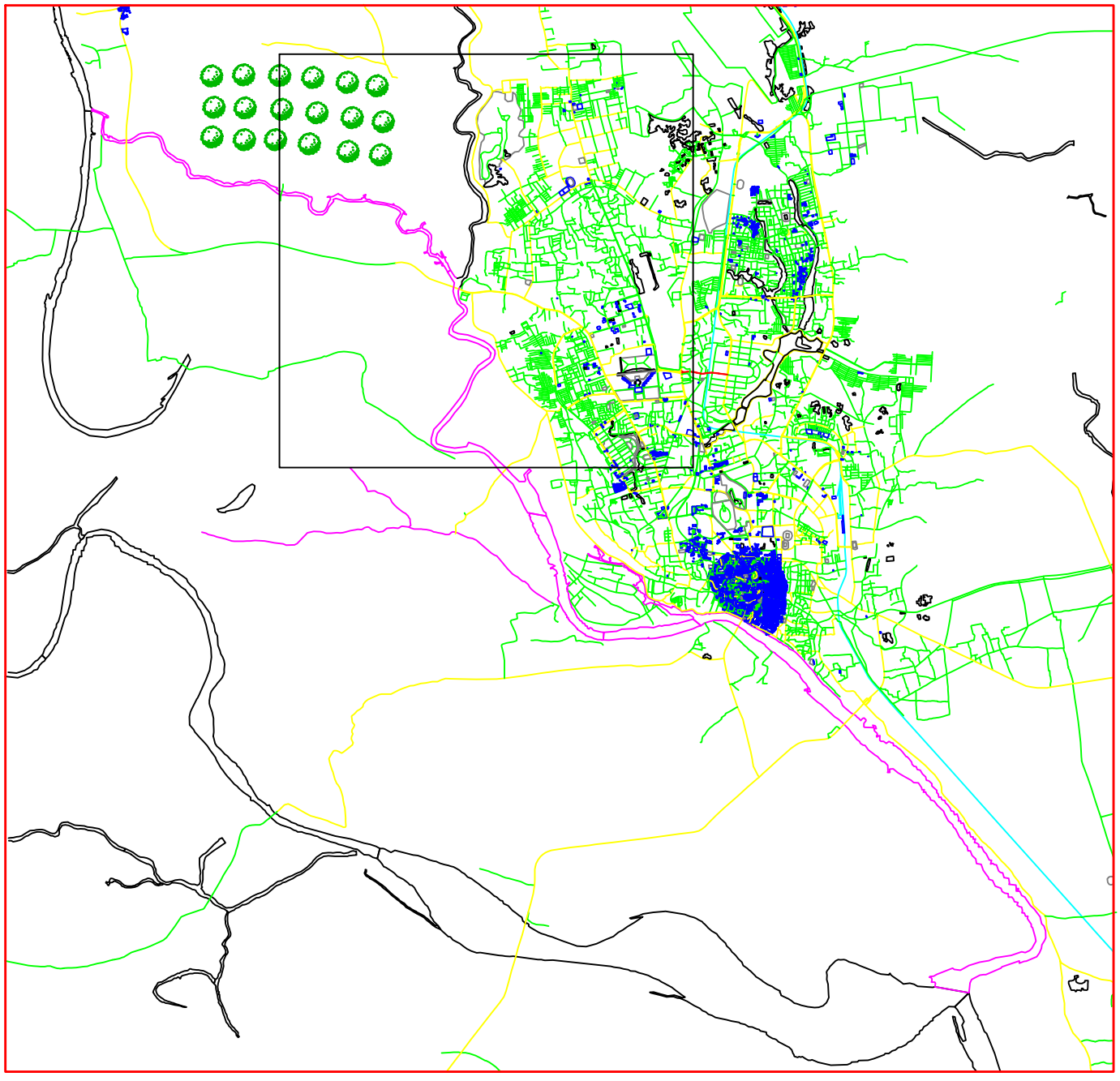
Judges review submissions before the event, attend the event, score all components, and provide constructive feedback to teams afterward.

Appendices

- Appendix A: Existing Site Drawing & Vicinity Map
- Appendix B: Envision Download Guide
- Appendix C: Deductions Form
- Appendix D: Request for Clarifications and Appeals Form

Appendix A: Existing Site Drawing & Vicinity Map

Included on the following two pages.



Buriganga River

Buildings

Parks

Railways

Roads_1

Roads_2

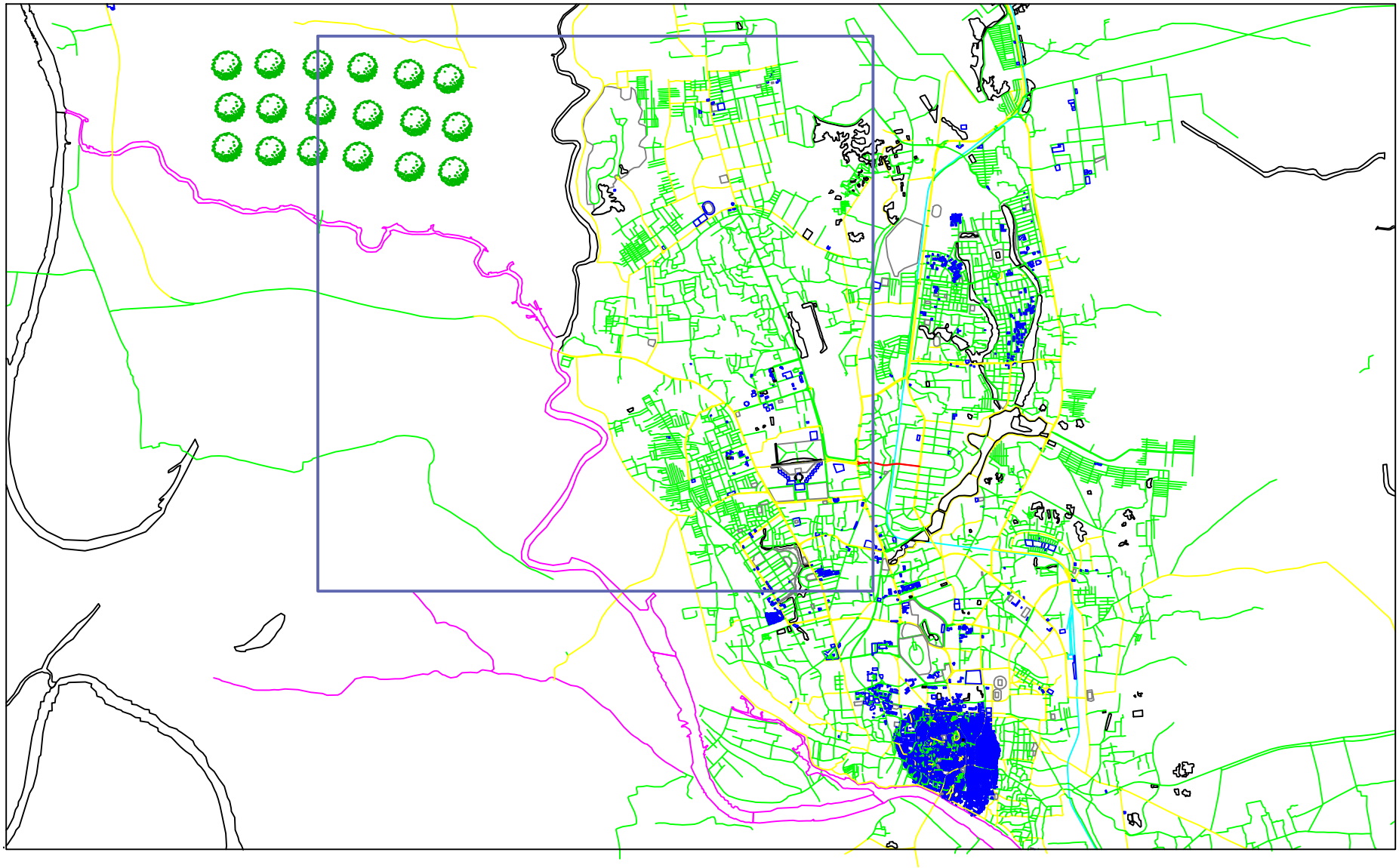
Roads_3

APPENDIX A

ASCE STUDENT SYMPOSIUM BANGLADESH 2026

SUSTAINABLE SOLUTION COMPETITION

EXISTING SITE VICINITY MAP
(BURIGANGA RIVER SITE CONVERSION)



APPENDIX A

ASCE STUDENT SYMPOSIUM BANGLADESH 2026

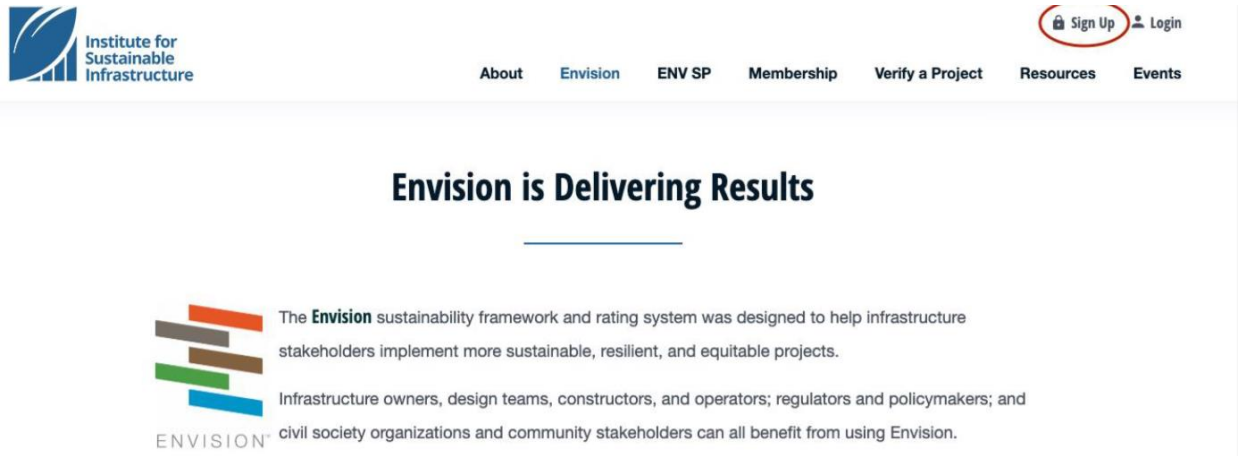
SUSTAINABLE SOLUTION COMPETITION

EXISTING SITE CONDITIONS
(BURIGANGA RIVER SITE CONVERSION)

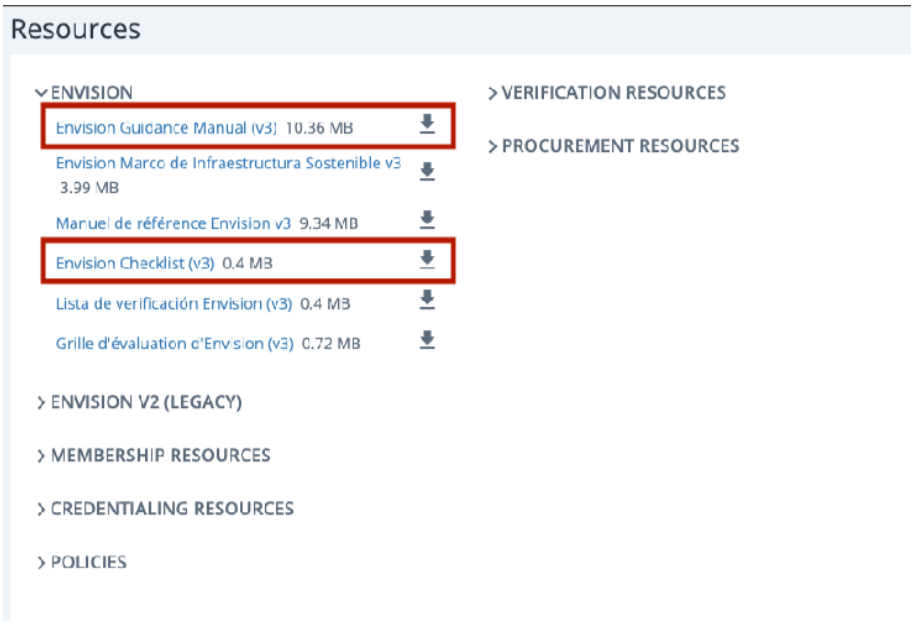
Appendix B. Envision Download Guide

The first step to accessing ISI resources (https://sustainableinfrastructure.org/envision/use-envision/) is to create a free account. Click "Sign Up" in the top right corner or "Join" at the bottom of any page. A detailed tutorial to sign-up is linked here.

Students should check if their academic institutions are member organizations of ISI. If so, they should affiliate themselves with the institution when creating their accounts. If an account is already created, log in to your dashboard, and under "Expand Your Account", select "Connect Organization".



Once logged in, the website will take you to your Dashboard. Scroll down to the "Resources" section where there are various Envision resources, including the Envision Guidance Manual and Envision Checklist (v3).



Appendix C. Sample Deductions Form

Head Judge Instructions: Tally deductions per SSC scoresheet. Provide deductions for Technical Design Proposal, Sustainability, and Poster at the Captains' Meeting. Provide deductions for Interview immediately following interview.

School Name:

_____

Technical Design Proposal (TDP)

_____ Does not include required information. (-2.5 points each, up to -10 points)

_____ Submission does not follow formatting requirements. (-2 points each, up to -10 points)

_____ Submission received past deadline.* (-5 points per day, up to -35 points)

Sustainability

_____ Does not follow formatting requirements. (-5 points each, up to -10 points)

_____ Submissions received past deadline. (-5 points per day, up to -35 points)

Poster

_____ Does not include required information. (-5 points each, up to -10 points)

_____ Does not follow formatting requirements.* (-2 points each, up to -10 points)

_____ Submission received past deadline.* (-5 points per day, up to -35 points)

Interview

_____ Interview team has fewer than 2 or more than 5 members.* (-30 points)

_____ Presentation is longer than 7 minutes and 5 seconds.* (-10 points for each 30 seconds over)

_____ 3-D site walkthrough is more than 2 minutes of the presentation.* (-30 points)

_____ Presentation 3-D site walkthrough uses non-compliant software. (-30 points)

_____ SKP file submission received past deadline.* (-5 points per day, up to -35 points)

**Deduction that cannot be appealed.*

I, the team captain, acknowledge the above deductions. I understand that I may submit an appeal (Appendix E) to the Head Judge prior to the appeals deadline.

_____	_____
Head Judge Name	Head Judge Signature
_____	_____
Team Captain Name	Team Captain Signature

Appendix D. Request for Clarifications and Appeals

Instructions for Teams: Please provide completed form to the Head Judge prior to the appeals deadline, as announced during the Captains' Meeting. Appeals must only involve your own team.

School Name:
Team Captain(s):
Contact Information:
Briefly describe nature of clarification or appeal:

_____

Head Judge Response:

_____
Head Judge Signature

The Head Judge should update deduction scoring if any appeals are granted.