Gilbane Proposal

Building More Than Buildings

October 3, 2008











Construction Management Services New Recreation Center

Worcester, MA







A. Project Understanding & Approach

Key Project Elements

After careful examination of the RFP documents and attendance at the preproposal meeting and site tour, the team has determined the following key project elements:

- Minimize disruption to Campus Life
- Carefully plan the site logistics
- Maximize student involvement
- Provide leadership in the preconstruction phase
- Take special care for student safety
- Aggressively facilitate LEED certification
- Precise QA/QC during construction

This section is our response to RFP Questions 2.E, 2.F, and 2.G.









Gilbane's BIM model showing the 25-feet clearance required to protect WPI's valuable trees near the site.

Minimize Disruption to Campus Life

Our approach to sensitivity to the main Quadrangle area will be similar to our work on the Bartlett Center. Our plan will be careful not to disturb dorm room and office activities, Harrington Auditorium events, educational activities at Higgins Laboratory, and fire lane access. We will be sensitive to other a activities such as graduation ceremonies, student use of the Quadrangle, and any summer camp activities.

Carefully Plan the Site Logistics

Due to the extremely congested site area with high student traffic, site logistics will require evaluation of many scenarios to determine the best plan that minimizes disruption to educational, athletic and other campus activities. Of particular concern requiring special consideration include:

- Trucking and laydown of the large structural members
- Controlling the day-to-day deliveries
- The separation, coordination, and communication of construction operations with WPI operations
- Clear separation of the construction trade contractors from students, staff, and visitors
- Minimize the disturbance and destruction of existing valuable trees, vegetation, campus character, and athletic fields

Maximize Student Involvement

Given the complexity of the project inherent to recreation centers and the challenge of building the structure into a hillside, there will be many opportunities for student major qualifying project subjects. In addition, Gilbane would continue to welcome as we have done on all our WPI projects, student involvement in project meetings, site tours, opportunities for in-class presentations, and the hiring student interns.

Beyond what we have accomplished in the past, Gilbane would seize the opportunity to work with WPI to expand the educational opportunities for WPI students by turning this project into an 'active classroom.' Our team welcomes the chance to proactively work with WPI faculty and staff to implement the following:

- On-campus guest speakers from Gilbane and selected subcontractors
- Materials and performance calculations for on-campus labs to test (i.e. concrete cylinders, rebar, etc.)
- Involve students in the development of the schedule or the site utilization plan
- Sponsor field trips to area waste recycling centers, steel fabrication shops, concrete batch plants, etc.





Preconstruction Leadership

Proper planning is always essential for successful project execution. We will thoroughly vet the design and engineering options to maximize the program while consistently seeking the best lower cost solutions, providing the information in terms of costs and time as the basis for WPI to make the best decisions. We will identify and track the high performance and sustainable design features to achieve LEED certification without adding costs to the project.

We will develop a preconstruction and construction schedule so that they are tied together. We will put a heavy early focus on cost estimating and value engineering alternatives, watching out for unpredictable cost escalation possibilities. We will also pay close attention to the structural systems, foundation and temporary wall, the rock excavation, and pool systems and finishes. These project elements will be fully explored for any potential value engineering possibilities.

Take Special Care for Student Safety

During the early design phase of the project, Gilbane will take a number of steps to separate construction activities from school operations, such as site separations relating to traffic, parking and deliveries of construction materials. In coordination with WPI, Gilbane will develop site-specific safety, logistics and phasing plans to ensure that all foreseen challenges are identified and appropriate solutions are implemented. These plans will be continuously updated and reviewed with school administration, staff and local authorities.

During the construction phase, weekly project and safety meetings will be held at the project site, in which Gilbane will review ongoing activities and give a lookahead schedule to WPI. Project manager Neil Benner will keep WPI constantly updated on the daily activities, bringing full awareness to the students, faculty and staff.

Aggressively Facilitate LEED Certification

The Gilbane team will support WPI and Cannon Design in full evaluation of various LEED certification scenarios. We will utilize our extensive experience building LEED certified higher education and athletic facilities to benefit the New Recreation Center project.

Our lead estimator Joe McCoy, project manager Neil Benner, and higher education practice group leader Larry Bacher are all LEED Accredited Professionals, and will be involved with the review of the LEED requirements throughout the preconstruction phase.









We understand the extensive data collection necessary for LEED certification. The team will utilize systems developed on the WPI Residence Hall project to satisfy the data requirements of LEED certification.

Precise QA/QC During Construction

Several parts of the project will require strict adherence to tolerance requirements. Concerns in the pool area include the pool structure itself, the vapor barrier and the mechanical and electrical elements. Other areas of concern include the temporary wall at the Quadrangle, the rock excavation, and the erection of structural trusses. Additionally, the athletic surfaces require specific tolerances in the subfloor and climate conditions preceding installation that must be anticipated in the schedule.

Project Challenges

Proposed project executive Bill Kearney and project manager Neil Benner have determined the project challenges include the following:

- · Stacked long-span truss structural system
- · Pool design and construction
- Quadrangle temporary retaining wall
- · Budget control during the Design Phase
- · Potential cost escalation
- Coordination of the work with athletic events on the playfields
- HVAC system

Stacked Long-Span Truss Structural System

With the basketball court to be located directly above the pool area, the structure will require one long-spanned truss on top of another. This stacked system will have to accommodate the active basketball court vibration not affecting the specialized pool corrosive-resistant finishes, the vapor barrier and the fireproofing.

Pool Design and Construction

There are several issues concerning the pool design and construction. These include:

- Rock excavation for the required depth
- Sequencing the work of the underground pool structure







To alleviate concerns about student safety, the Gilbane team required each delivery truck that moved through the WPI campus to the Bartlett Center project site have a spotter assigned to it. The spotter was responsible for making sure any students in the area were safe and aware of the truck's movements.

Student Safety Efforts

Gilbane understands that the two most important issues during construction are the students' education and the safety of everyone in and around the construction site. In our experience, planning is the key to a successful construction program on a busy campus. The planning process is structured to respond to the user's needs first by considering access and egress of the existing buildings, maintenance of all emergency exits and the schedule for ongoing educational activities.

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During the construction phase, weekly project and safety meetings will be held at the project site, in which Gilbane will review ongoing activities and give a lookahead schedule to WPI. Project manager Neil Benner will keep WPI constantly updated on the daily activities, bringing full awareness to the end users.

Safety on the Bartlett Center

Same as the new Recreation Facility, the Bartlett Center is located in the Quad, directly adjacent to dormitories, athletic facilities, science laboratories, classroom buildings, and main pedestrian walkways. The project site was very tight and construction space was limited. From the beginning, as construction manager on the project, the **Gilbane team identified ensuring student safety and keeping disruptions to campus activities to a minimum as a top priority**. Project Manager Neil Benner and worked closely with the WPI Facilities Department and Campus Police to carefully plan, schedule and coordinate all construction activities with the goal of minimal disruption to campus activities and student safety.

As an example, the delivery of materials to the construction site presented a safety concern. Due to the site's location, materials delivery would require large trucks driving in and out of the main pedestrian walkways on campus. To alleviate concerns regarding student safety, each truck that moved through the site was required to have a spotter assigned to it. The spotter was responsible for making sure any students in the area were safe and aware of the truck's movements. The Gilbane team also managed all trade contractors making sure they understood and followed the safety guidelines put in place for the Bartlett Center project.

The results of the Gilbane team's efforts was a very safe project. The project recorded 51,398 total manhours with no lost time cases and over 250 days without a recordable incident.



SECTION 2: Commentary on Scope D. Sustainability

D. Sustainability

Team's Experience With LEED

The team's extensive knowledge base has been acquired through a number of successful LEED and sustainable building projects including:

- WPI East Hall
- WPI Bartlett Center
- URI Residence Halls
- URI Biotech & Life Science Building
- URI Island Pell Library Oceanographic Research Building

The team will incorporate their LEED and sustainable building experience in the following ways throughout design, construction and ongoing operations and maintenance.

Sustainable Suggestions for Athletic Facility and Pools

In addition to the team's sustainable construction and LEED experience, we have compiled a list of preliminary athletic facility and pool sustainable design considerations from our Gilbane's Sustainability and High Performance Center of Excellence.

Pool covers - A pool cover is a must for comfort, water conservation and humidity control . At the New Haven schools projects, Gilbane installed an electric pool covers that are deployed with the flick of a switch. The cover has made a noticeable difference from the start.

Pool heating - Consider a solar hot water system to heat the swimming pool. Geothermal systems can be used for heating and dehumidification systems.

Gym flooring - Explore FSC-certified wood, reclaimed wood or recycled flooring as one of these options is required for LEED credits. Another flooring alternative is a recycled rubber.

Lighting - On the New Haven project, Gilbane installed high bay four-bulb fluorescent fixtures on occupancy sensors which resulted in significant savings. Compared to metal halide "high hat" fixtures, the light is better and is instantaneous, with no warm up period. Also consider natural day-lighting whever possible, keeping in mind to 'washing the walls' with sunlight not the floors to prevent glare.

Locker rooms - Consider low flow sinks, toilets, showers, etc.

This section is our response to RFP Question 2. C Team's experience with LEED and ability to incorporate sustainable measures into project design, construction, and operations.

Gilbane ranks #7 ENR Top Green Contractor

Gilbane LEED Statistics:

- 103 projects are sustainable, high performance or LEED certified
- 82 LEED certified projects
- 39 LEED certified higher education projects
- 167 of Gilbane's staff are LEED APs,
- 50% construction recycling is required on all Gilbane Projects



Gilbane's commitment to environmental responsibility is based on the simple principle of "Doing the right thing for communities where we live and work," says Thomas Gilbane, Jr.





LEED AP staff on Gilbane's team:

Larry Bacher, Higher Ed Practice Leader Joe McCoy, Estimating Executive Neil Benner, Project Manager **Fitness equipment** - Consider refurbished or used equipment rather than purchasing new.

Other - Try to obtain recycled content in furnishings and finishes, and utilize low VOC paints and finishes.

Design

The Gilbane team is dedicated to assisting WPI in developing a sustainable design strategy that is not only environmentally responsible, but that meets the project's timeline and will not add to the cost of the project. It is critical to start early in the project development process in order to establish the plan to achieve the LEED certification goal.

As leader of the Gilbane's national Higher Education Practice Group, Larry Bacher, LEED AP, has the opportunity to be involved with many of Gilbane's higher education projects across the country. His background as a trained architect, LEED accredited professional standing, combined with his first hand knowledge of lessons learned and best practice experience will be significantly utilized through the preconstruction and design phase of the project.

Joe McCoy, LEED AP, will lead the estimating services and assist with the value management and GMP development. Joe's experience with prior LEED and sustainable building projects and LEED accredited professional standing enable Joe to provide valuable input into all major design review meetings. Gilbane's design phase services are critical to establishing the overall LEED strategy, which will include creative input from Joe regarding estimating, value engineering, life cycle cost analysis, scheduling and constructability.

Project manager, Neil Benner, LEED AP will also assist in the development of the LEED strategy during the design phase. He will utilize his LEED accredited professional standing, along with his significant involvement on WPI's Bartlett Center and East Hall projects LEED certification strategy development.

Larry, Joe and Neil have the existing relationship with Cannon Design through working on the East Hall project to thoroughly explore LEED certification scenarios. This excellent working relationship translates into a design team that is truly engaged in creating a dynamic LEED strategy that WPI will be proud of and that students can participate in.

Also during preconstruction, project executive, Bill Kearney and project manager, Neil Benner, LEED AP, will start the commissioning planning. It is important to begin this process early to effectively plan and schedule for these critical activities for optimum building operation and maintenance.





Construction

Project executive, Bill Kearney and project manager, Neil Benner, LEED AP, are ready to lead the team through the construction phase of yet another successful LEED project. It is very critical that LEED requirements are included in A/E front end documents and in pertinent specification sections as well as in the front end CM documentation.

Neil will also utilize the LEED documentation systems developed on both the Bartlett Center and the East Hall to properly document the LEED certification requirements.

The engineering team will be headed by Don Venerus with the support of Melissa Hinton to ensure LEED requirements are met. Their past experience working together on the East Hall Project includes:

- Verifying the sustainable components of the specifications, drawings and bid packages to make sure they contain all necessary detail to ensure subcontractor support of the LEED process.
- Ensuring LEED required subcontractor submittals are obtained and appropriately reviewed.
- Utilizing Gilbane's quality in construction program to ensure compliance with and documentation specified requirements.
- Assemble the LEED Certification Application Submittal Package.

Overall, during construction, the team will bring their collective experience in the following areas to the project:

- Recycling of construction debris
- Establish suppliers of local material and FSC certified wood
- Installation of air cooled chillers, automatic fan coil shut-offs, green roof systems, storm water monitoring, large curtain walls to increase daylighting, and water efficient plumbing fixtures
- Establish an Indoor Air Quality management plan

East Hall LEED Involvement

Additionally, many of the proposed team assisted in the LEED strategy and document efforts on the new East Hall projects. Some of those LEED elements include:

- Air-cooled chillers (one of the first projects in the U.S. to utilize this technology)
- Large curtainwall and windows maximize daylighting











- Structural and finish materials that include recycled content, are derived from local sources, and are low in volatile organic compounds and added ureaformaldehyde
- Landscaping that requires little or no irrigation
- Light-colored exterior paving to reduce the heat island effect
- Green roof covering a third of the roof, comprised of pallets to provide student learning opportunities to study plant materials best suited for green roofs
- Green roof storm water monitoring systems to measure and monitor water quality
- The remaining roof surface is a reflective white roof to minimize cooling requirements and heat island affect on the site
- Highly energy efficient boilers combined with heat recovery systems to reduce energy costs and aluminum sunscreens to minimize heat gain through the large windows
- "Low-flow" conservative water fixtures were installed
- Operable windows that communicate with the HVAC system to shut down when they are open
- Construction waste management recycling over 50% of construction debris
- Over 50% of the permanently installed wood was Forest Stewardship Council (FSC) certified
- Exterior lighting design to minimize light pollution
- Vertical sun-shading on West façade and horizontal sun-shading was used on the South and East façade to optimize energy savings by minimizing solar head gain and glare

Operations

Charlie Kelly, the MEP coordinator, will oversee the construction of the complex MEP system in the facility. Charlie will coordinate the installation of the ductwork and many other complex components to ensure proper operation particularly in the pool area. When properly installed, the MEP system will operate most efficiently, thereby contributing to the overall sustainability of the building.

Project executive, Bill Kearney and project manager, Neil Benner, LEED AP, will also lead the team through a successful commissioning at the conclusion of the construction phase, which will ensure that all building systems are operating at their peak.





Gilbane Site Office Efforts

Gilbane will instill sustainable practices in the everyday operations of our projectsite. The project team will install Energy Star rated office machines; undertake a comprehensive recycling program; purchase paper and other products with recycled content as well as encourage the use of public transportations.

Gilbane's Sustainability and High Performance Center of Excellence

An interregional Sustainability and High Performance Center of Excellence keeps the company up to date on the latest sustainable technologies and techniques. The center of excellence helps Gilbane stay abreast of changes and advances in sustainable practices, and continue to provide our clients with services that are both appropriate and valuable.





Schedule

Design Phase

On East Hall, great teamwork among Cannon Design, WPI, and Gilbane contributed to a design phase where the team met all the major milestone dates necessary to get the project off to a great start. Gilbane is confident that our team can work with Cannon and WPI to re-create that schedule success in the design phase on WPI's new Recreation Center project.

Our proposed activities include four cost estimates, value engineering, constructability reviews, and cost trending. Activities also include scheduled completion dates for Cannon and WPI to follow for design milestones completion and owner acceptance.

The most important deliverable in preconstruction is the preparation and issuance of the early site and structure package in mid-March in 2009. This is a critical date to meet so that Gilbane can start procurement and submittals for foundations and steel as well as proceed with the permitting process. As the goal is to start construction immediately after graduation, this deliverable date must be achieved.

The second most important deliverable is the issuance of the balance of the design packages in early May in 2009, so the rest of the packages can be procured and the GMP can be submitted and approved in early June.

Construction Phase

Spring-Fall, 2009

Soil conditions will heavily affect the durations of foundation construction for the new Recreation Center. The first activities, starting on June 1, 2009, will be installing the earth retention system and performing the excavating bulk of the hill. For this schedule (and after some research), Gilbane has assumed soil nailing to be the most likely system for this project. However, if geotechnical conditions require another system such as a soldier pile and lagging wall, the 73-day duration shown could significantly increase.

Another unknown condition at this time is the extent of and actual location of bedrock. If the bedrock is encountered at the toe of the slope and/or at the elevations above the bottom of the pool, drilling and blasting will be necessary. The drilling and blasting would have to occur either before or after bulk excavation and prior to foundation work. The extent to which the earth retention system could be installed prior to blasting would have to be fully analyzed with Cannon during preconstruction. The rock may be able to be removed with equipment such as a hoe-ram which will shorten the removal period. We would





want to work with the team to minimize rock excavation. We have projected foundations to occur from mid-September to mid-November, however our proposed schedule assumes no blasting will be required for this activity.

Given the location of the building and the difficulty of crane access to the Southern half of the site, the new Recreation Center's superstructure will have to be erected, and gym slab placed, prior to the excavation and placement of the pool shell and the MEP underground. Another reason to delay the pool shell is the crane position that will be necessary due to the weigh of the 100-foot-long trusses at both the pool and gym ceilings. The pool ceiling trusses are supporting the gym floor and will be much heavier than roof trusses and will make it necessary for the crane to be within 30-50 feet of the truss position. With a 37-meter-long pool, there is not sufficient space to allow for the excavation and placement of this size pool shell as the crane erecting the trusses needs to be on solid, level ground as required by OSHA standards. Gilbane will also install all overhead MEP work over the pool prior to pool construction. Gilbane expects to start steel erection in mid-November and complete in mid-April, 2010.

Winter-Fall, 2010

The slabs are expected to start in January of 2010 and should complete near the end of March, just as the exterior walls and roofing are starting. Exterior weather protection and a temporary heating system will be necessary to place the slabs on the metal decks. Once the pool shell and associated underground work is complete at the end of May, the slab-on-grade will be placed in the pool area. Interior studs, CMU, and MEP rough-in will start throughout the building near the end of March and be complete at the end of the year. All slabs will be complete by the end of April. Throughout late spring, summer, and early fall, exterior masonry will proceed with window systems and roofing following closely behind. Exterior walls and roofing will be complete in November, in time to avoid any weather protection or temporary heating systems. Interior finishes will start in October, so meeting this close-in date in November is critical. We will plan on using the permanent HVAC systems to temporarily heat the building for the winter for the finish work.

Winter-Summer, 2011

As the finishes progress, the pool decks will be placed and much of the gym and pool equipment will start installation. The MEP equipment will be installed for the building and pool systems, and pool finishes will commence. As the finishes are nearing completion at the beginning of May, the building systems will be started, the pool filled, and the systems commissioned. It is Gilbane's goal to gain substantial completion by the beginning of June to give WPI an additional month to move into the building and start-up internal operations for the new facility. This will also provide ample time for the commissioning process of all mechanical and electrical systems and the critical systems in the pool.





Lessons Learned from Two Similar Projects

We have selected two exemplary projects that are similar to WPI's new Recreational Center in terms of size, scope and complexity. Below, please find a brief overview of each project, followed by a narrative hilighting how our team will apply the successes and avoid pitfalls experienced on these projects.

Ohio State University - Recreation & Physical Activity Center, Columbus, OH

This \$154 million facility houses the **largest aquatic center in the U.S.** at the time of construction. The showcase project was featured in a 2007 National Intramural-Recreational Sports Association (NIRSA) conference session on designing and construction large aquatic facilities. The construction spanned 50 months, completing in 2007.

The 650,000 SF recreation center includes:

- Aquatic center for swim team practice, competition, and member use:
 - 50 meter competition pool
 - Diving well with 10 meter diving platform
 - · Recreation pool
 - · Lap pool
 - · Leisure pool
 - Leisure spa/whirlpool
- Basketball, volleyball, badminton, racquetball, and squash courts
- 25,000 SF of fitness and conditioning space
- Student wellness center
- · Turf gymnasium suited for indoor soccer, lacrosse, and batting practice
- Climbing wall
- Outdoor adventure center where members can check out camping and canoeing equipment

The building also contains sports and exercise laboratories, classrooms, and offices for the physical education department. In addition, the outdoor facilities include 16 tennis courts and three multi-purpose grass fields.























Applicable Lessons Learned

- If installing the pool shell after superstructure, use exhaust fans to eliminate the
 potential deterioration of the paint coating on all exposed metals caused by the
 diesel exhaust from construction vehicles.
- Due to the strict tolerances required in regulation Olympic pool dimensions, the CM should buy the rough and finish pool materials from the same contractor.
 This will relieve issues of coordinating two contractors to achieve such a precise finished product.
- Verify allowable construction loads and equipment paths on concrete slabs to eliminate cracking of concrete. Also perform this in the pool deck area. This will also factor into the decision to construct the superstructure prior to the pool/slab/deck since crane(s) will be needed for erecting long span structural steel.
- Due to the corrosive environment of a pool facility, the following precautions should be made:
 - A high performance epoxy coating needs to be applied to all exposed steel located within the pool environment, including the edge of slabs exposed steel.
 - Hire a third party consultant to inspect paint and high performance coatings applied in the field to ensure adequate coverage.
 - Paint the tops of all steel beams prior to installation of metal deck is recommended.
- Pool area specifications require vapor barriers to have to have a six inch overlap
 which became and issue through out construction. It is recommended to hire
 a third party consultant to work during the design and construction phases to
 provide input for the design details of this system from the beginning.
- When the pool is filled during construction to perform water tightness and or
 pressure tests on the pool structure, gutters, tanks, etc., provide appropriate
 safety precaution measures including a full-time safety watch, temporary guard
 rails, and life safety devices.
- Tile installation should be specified with mud-set instead of thin-set to allow for adjustments as necessary to produce adequately sloped pool decks.
- Pool commissioning requires 3-4 weeks following the final water filling.
 Commissioning needs to be completed without the presence of other trades so be sure to include 3-4 weeks in the schedule for this item.
- Perform pipe system flushing of pool prior to applying final finish coat of tiles or plaster to prevent staining.
- Include additional surveying funds for pool layout. In addition to checking
 perimeter dimensions, check and verify for lane locations and other markings
 required of a certified Olympic size pool.



Prince George's County Sports & Learning Complex, Landrover, MD

Proposed project executive **Bill Kearney served as the project executive** on this \$31 million community athletic facility. The Prince George's Sportsplex is a multiuse sports, recreation, learning and retail complex, with a construction schedule that spanned 36 months.

The sportsplex includes:

- 50,000 SF aquatic center:
 - 50-meter Olympic-size pool
 - 25-yard six-lane warm-up pool
 - · Warm-down leisure pool
 - · Spectator seating
- 100,000 SF field house:
 - 200-meter state-of-the-art indoor track
 - 3,000 retractable spectator seats
 - · Multiuse area within the track
 - · Administrative and support areas
 - · Shell for a fitness facility and retail
 - · Concession areas within an atrium
- 30,000 SF gymnastic, fitness and training area

Subsequent phases in the master plan included an outdoor ice rink, indoor and outdoor miniature golf courses, an indoor tennis center, a picnic area, a playground, and other park and recreation facilities.

Applicable Lessons Learned

- Temperature control equipment selected for the aquatic center needs to be verified to confirm it meets the specified tolerances to maintain required water temperature ranges.
- During back-washing of the filtration system, large quantities of water are
 flushed through the system. Disposal of the water during this process as well
 as during pool draining needs to be accounted for in the design to comply
 with City of Worcester regulations.



















- Prince George's County used PoolPak mechanical system to control the aquatic area separately from the rest of the facility. The system has performed well since installation, and is recommended for the sensitive pool environment.
- A code consultant was hired to interpret building codes as well as assist in design due to the facilities multiple building type classifications. An example of multiple use is that a play court could also serve as an public assembly space, which will increase the occupant load and effect the design of life safety systems. Other uses in the facility are offices, storage and recreation spaces. The code will need to be interpreted as it does not address each varied use of the facility.
- Multi-craft staging was provided by the CM to assure proper sequencing of wok in the pool area.
- A movable bulkhead was included in the pools design to provide the user with the ability to divide a larger single activity pool into a multiple activity pool.
 This has been a well received feature, used by competition officials, lifeguards and swimmers.
- Specify stainless steel for the pool areas piping, duct work, hangers, accessories to prevent corrosion.
- Verify any and all specified epoxy paint or coating compatibility with the primers.
- Verify the pool water maintenance chemicals used are correctly administered, as a mistake can lead to deterioration of tile grout, necessitating a tile replacement.
- If the facility is going to accommodate video recording, the pools lighting needs to be designed accordingly. Using a mixture of up and down lights will reduce glare providing a superior filming conditions.



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