When it comes to providing moisture-free and energy-efficient living space for the home, precast concrete is your answer. Designs vary from thin-shell precast concrete with a partially embedded metal frame to panels with sandwich insulation and concrete headers, footers, and studs. Panels are available in standard sizes and custom designs.

Advantages of Precast Concrete Foundations

LEED Homes

- SS 1.2 – Site Stewardship: Minimize Disturbed Area of Site
- SS 5 – Site Stewardship: Nontoxic Pest Control
- MR 1.4 & 1.5 – Material Efficient Framing
- MR 3.2 – Waste Management

LEED New Construction

- SS 5.1 – Site Development – Protect Or Restore Habitat
- MR 4 – Recycled Content
- MR 5 – Regional Materials

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For additional information about using precast concrete within the LEED system, please visit www.precast.org
**Stronger and tougher**
Precast concrete foundation systems are constructed with a minimum of 4,000 psi concrete. By comparison, cast-in-place foundations usually consist of 3,000 psi concrete. A lower water/cement ratio and a controlled curing process creates a denser matrix within the concrete to provide a foundation panel that is less susceptible to water infiltration when compared with cast-in-place and block foundations.

**Energy efficient**
Not only will your basement remain dry, but it will also retain heat during those cold winter months. Concrete’s thermal mass alone will reduce a home’s peak heating and cooling loads. Additional insulation can be cast into each panel or added between each structural rib before finishing to increase the thermal resistance (R-value) of the foundation. A precast concrete foundation system will reduce the operating costs associated with heating and cooling your home throughout its expected life.

**Highly uniform**
Because precast concrete products are manufactured in a controlled environment, they exhibit high quality and uniformity. Factors affecting quality typically found on a job site – temperature, improper curing, poor craftsmanship and material quality – are nearly eliminated in a plant environment.

**Ready when you are**
Because precast concrete foundation systems are manufactured well in advance of installation, they are ready for transport to the job site at a moment’s notice. Precast foundation systems are quickly installed in a matter of hours using a crane and a small crew, saving days or weeks over alternative foundations. Since the panels are installed on a gravel footing, water will drain away from the wall, minimizing the possibility of settlement. Backfilling can begin once the basement floor is poured and the first floor bracing is installed, rather than waiting several days for cast-in-place concrete to reach proper strength.

**Weather not a factor**
Precast concrete increases efficiency because weather will not delay the manufacturing process in the precast plant. In addition, weather conditions at the job site do not significantly affect the installation of a foundation system.

**Customize with ease**
An energy-efficient, moisture-free basement can mean additional living space that will greatly increase a home’s square footage. Engineered openings for electrical and plumbing fixtures make for easy finishing. Walkout basement doors or egress windows can easily be incorporated into the design to comply with fire safety requirements.

**Lower lifetime costs**
Precast concrete foundation systems offer lower long-term costs in terms of heating and cooling a home. Expenses caused by moisture damage and mold removal can be avoided by eliminating the potential for moisture ingress. Additionally, because precast concrete foundation systems require significantly less construction time, overall project cost savings can be realized. Precast concrete foundation systems are the right choice when it comes to providing a long-lasting, energy-efficient, moisture-free living space.
**Credit Requirement**

**Max. Points: 1**

**Site Stewardship: Minimize Disturbed Area of the Site**

Minimize disturbance to the site by meeting the following:

**Where the site is developed:**

a) Develop a tree or plant preservation plan with “no-disturbance” zones clearly delineated on drawings and on the lot.

b) Leave undisturbed at least 40% of the buildable lot area, not including area under the roof. Only softscapes can be counted toward this credit; projects cannot receive credit for preserving preexisting hardscapes, such as driveways. Or,

**Where the site is previously developed:**

c) Develop a tree or plant preservation plan with “no-disturbance” zones clearly delineated on drawings and on the lot, and rehabilitate the lot by undoing any previous soil compaction, remove existing invasive plants, and meeting the requirements of SS 2.2. Or,

d) Build on a site with a lot area of less than 1/7 acre, or with housing density for the project that is equal to or greater than 7 units per acre. For multifamily buildings, the average lot size shall be calculated as the total lot size divided by the number of units.

**Note:** Any “No disturbance” zones must also be protected from parked construction vehicles and building material storage. Soils compacted by vehicles or stored materials can cause major difficulties in establishing any new landscaping.
Credit Requirement  Max. Points: 2

Pest Control Alternatives (1/2 point each, maximum 2 points) Implement one or more of the measures below. All physical actions must be noted on construction plans:

- Keep all wood (i.e. siding, trim, structure) at least 12 inches above soil (code usually requires 8 inches)
- Seal all external cracks, joints, penetrations, edges, and entry points with caulking. Where openings cannot be caulked or sealed, install rodent-and corrosion-proof screens. Protect exposed foundation insulation with moisture-resistant, pest proof cover fiber cement board, galvanized insect screen.
- Include no wood-to-concrete connections or separate any exterior wood-to-concrete connections with metal or plastic fasteners or dividers.
- Install landscaping such that all parts of mature plants will be at least 24 inches from the home
- In areas marked “moderate to heavy” through “very heavy” on the termite infestation probability map, implement one or more of the following measures (1/2 point each):
  1. Treat all cellulosic material with a borate product to a minimum of 3 feet above the foundation.
  2. Install sand or diatomaceous earth barrier.
  3. Install a steel mesh barrier or termite control system.
  4. Use noncellulosic (i.e., not wood or straw) wall structure
  5. Use solid concrete foundation walls or masonry wall with top course of solid block bond beam or concrete-filled block

Precast Contribution

Precast concrete is resistant to all insect attacks and qualifies as pest proof.

Precast concrete foundations are the perfect choice to ensure that no wood gets within 12 inches of grade, which eliminates the need for additional alternative termite resistance measures.
Credit Requirement

Environmentally Preferable Products

(0.5 point each, maximum 8 points)

Use building component materials that meet one or more of the criteria below:

- Environmentally preferable products. 0.5 points for using a foundation with 30% fly ash/slag. An additional .5 point for exemplary performance of 50% flyash/slag, and/or
- Low Emissions (not applicable for concrete), and/or
- Local Production. 0.5 points for using a foundation that was extracted, processed, and manufactured within 500 miles of the project site.

Precast concrete products may contain supplementary cementitious materials such as fly ash and blast furnace slag, which will add to the project’s recycled content goals.

Because concrete uses plentiful and natural raw materials, concrete components can be extracted, harvested and manufactured within 500 miles of the project site. Using locally obtained raw materials helps reduce the environmental impact of carbon emissions.

Precast concrete does not emit harmful volatile organic compounds (VOCs), which contributes to better air quality even if the low emissions may not be calculated in this credit.

The NPCA LEED calculator helps members respond with the proper documentation required for this credit. Simply input the Zip Code/Postal Code and weight for each component to generate a pdf file that can be e-mailed directly to the LEED AP, contractor or architect.
Credit Requirement

Max. Points: 3

Waste Management – Construction Waste Reduction

3.1 Construction Waste Management Planning (Prerequisite)
Investigate and document local options for diversion, then document the diversion rate for construction waste. See LEED Homes Guide for the full prerequisite.

3.2 Construction Waste Management Reduction
Reduce or divert waste generated from new construction activities from landfills and incinerators to a level below the industry norm. Use either of the two options:

a) Reduced Construction Waste. Generate 2.5 pounds or less of net waste (not including waste diverted reclamation or recycling) per square foot of conditioned floor area. Use the table to determine the score.

b) Increased Waste Diversion. Divert 25% of more of the total materials taken off the construction site from landfills and incinerators. Use the table to determine the score. Calculate the percentage using either weight or volume.

AMOUNT TO LANDFILLS AND INCINERATORS

<table>
<thead>
<tr>
<th>Reduced Construction Waste</th>
<th>Increased Waste Diversion</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lbs./Ft.²</td>
<td>Cubic Yds./1,000 Ft.²</td>
<td>% Waste</td>
</tr>
<tr>
<td>4.0</td>
<td>25.5</td>
<td>100.0%</td>
</tr>
<tr>
<td>3.5</td>
<td>22.3</td>
<td>88%</td>
</tr>
<tr>
<td>3.0</td>
<td>19.1</td>
<td>75%</td>
</tr>
<tr>
<td>2.5</td>
<td>15.9</td>
<td>63%</td>
</tr>
<tr>
<td>2.0</td>
<td>12.8</td>
<td>50%</td>
</tr>
<tr>
<td>1.5</td>
<td>9.6</td>
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<tr>
<td>1.0</td>
<td>6.4</td>
<td>25%</td>
</tr>
<tr>
<td>0.5</td>
<td>3.2</td>
<td>13%</td>
</tr>
</tbody>
</table>

This credit allows for 2.5 pounds of construction waste per square foot of floor space. Precast concrete can contribute toward this credit because it is plant produced, which creates little to zero on-site construction waste. Less on-site waste means less transportation of waste, less clean-up time, and less time spent sorting recyclables. These savings can contribute to a quicker, cheaper project and a more efficient construction schedule.
Credit Requirement

Max. Points: 1

Site Development – Protect or Restore Habitat

Case 1 – Greenfield Sites
Limit all site disturbances to the following parameters:

• 40 feet beyond the building perimeter
• 10 feet beyond surface walkways, patios, surface parking and utilities less than 12 inches in diameter
• 15 feet beyond primary roadway curbs and main utility branch trenches
• 25 feet beyond constructed areas with permeable surfaces (such as pervious paving areas, stormwater detention facilities and playing fields) that require additional staging areas to limit compaction in the constructed area, or

Case 2 – Previously Developed Areas
Restore or protect a minimum or 50% of the site (excluding the building footprint) or 20% of the total site area (including building footprint area), whichever is greater, with native or adapted vegetation.

See the LEED Canada guide for information on Canada’s credit requirements.

Precast Contribution

Precast concrete products are cast and cured in the plant and delivered to the site ready to set so they reduce the staging area required, which can reduce the overall site disturbance.

The impact on the construction site is also reduced because there is no additional formwork, which often requires more construction area for above-ground products and larger excavation areas for underground products.

Less impact on sites can reduce construction waste, shorten the construction schedule and require fewer laborers on-site.
Recycled Content

Use materials with recycled content such that the sum of postconsumer recycled content plus 1/2 the preconsumer content constitutes at least 10% or 20% (based on cost) of the total value of the materials in the project. The minimum percentage materials recycled for each point threshold is:

<table>
<thead>
<tr>
<th>Recycled Content</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td>1</td>
</tr>
<tr>
<td>20%</td>
<td>2</td>
</tr>
</tbody>
</table>

The recycled content value of a material assembly is determined by weight. The recycled fraction of the assembly is then multiplied by the cost of the assembly to determine the recycled content value.

Mechanical, electrical and plumbing components and specialty items such as elevators cannot be included in this calculation. Include only materials permanently installed in the project. Furniture may be included if it is included consistently in MR Credit 3: Materials Reuse through MR Credit 7: Certified Wood.

Precast Contribution

Precast concrete products may contain supplementary cementitious materials such as fly ash and blast furnace slag which will add to the project’s recycled content goals.

Precast products may also contain rebar and welded wire mesh which is often made from recycled steel.

Other less frequently used recycled content components include various fiber reinforcements, glass aggregates, silica fume, and recycled crushed concrete.

The NPCA LEED calculator helps members respond with the proper documentation required for this credit. Simply input the Zip Code/Postal Code and weight for each component to generate a pdf file that can be e-mailed directly to the LEED AP, contractor or architect.
Credit Requirement

Max. Points: 2

Regional Materials

Use materials or products that have been extracted, harvested, and manufactured within 500 miles of the project site.

The calculation is based on the overall materials cost. Materials costs include all expenses to deliver the material to the project site. Materials costs should account for all taxes and transportation costs incurred by the contractor but exclude any cost for labor and equipment once the material has been delivered to the site.

Regional Materials of 10% = 1 point
Regional Materials of 20% = 2 points

See the NPCA LEED Calculator at www.precast.org/leed for help with this credit.

See the LEED Canada guide for information on Canada’s credit requirements.

Precast Contribution

Because concrete uses plentiful and natural raw materials, concrete components can be extracted, harvested and manufactured within 500 miles of the project site. Using locally obtained raw materials helps reduce transportation distances which reduces the environmental impact of carbon emissions.

If shipping is done by rail or water, LEED Canada allows up to 2,400 km (1,500 miles) from both the manufacturing site to the project site and the location where building materials are extracted, harvested, recovered and processed to the manufacturing site.

The NPCA LEED Calculator helps provide the proper documentation required for this credit. Simply input the Zip code where each raw material originates and the weight of each material to generate a printable file that can be e-mailed to the LEED AP, contractor or architect.