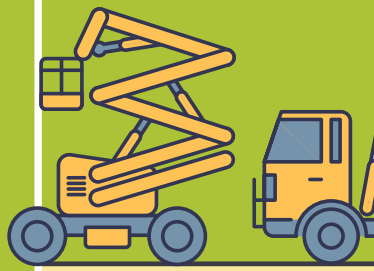
BILD EDMONTON METRO

FOUNDATIONS OF BUILDING & CONSTRUCTION



The Dirt to Door Series offers a unique, behind-the-scenes look at what it takes to build thriving communities from the ground up. Through guided tours and expert-led discussions, participants explore various places across our region learning how community builders create identity, support business retention, and design vibrant, people centered places.

This series dives deep into the land development process, covering everything from planning and zoning to housing typologies, streetscapes, parks, and other critical infrastructure. It also looks at how design and sales play a role in bringing different housing types together to be buyer ready. The Dirt to Door Series is an immersive experience that connects policy, people and community, showcasing how great neighborhoods come to life.

WHAT WE'RE LEARNING TODAY

- Survey & Stakeout
- Excavation
- Footing & Foundation
- Framing & Lock-up
- Mechanical, Electrical, & Plumbing

BILD® EDMONTON METRO

BILD Edmonton Metro, or Building Industry and Land Development Edmonton Metro, is the voice and expert resource of the real estate development industry. Our more than 500+ member companies are from all corners of the industry – real estate developers, home builders, renovators, financial and professional service organizations, trade contractors, and manufacturers and suppliers of all types of commercial and home-oriented products.

SURVEY & STAKEOUT

WHY PLANNING MATTERS

As with any project, without a plan, it is impossible to get the job done. Builders need to ensure that their budgets and timelines are kept within scope to ensure their product can meet the end consumer quickly and with quality. Because of this, builders have a lot of things to consider before shovels hit the ground;

→ Scheduling several different trades to be onsite at the same time or in succession,

→ Ordering materials at the right times to avoid too much being on site, which can lead to damage and theft,

→ Superintendent scheduling difficulties between multiple sites,

→ Compliance and Inspections.

PIP INFORMATION – WHY IT MATTERS

A Project Implementation Plan (PIP) from the City of Edmonton is a comprehensive document that outlines the key requirements, timelines, and coordination details necessary for initiating and completing a residential or commercial construction project. It includes critical information such as approved grading plans, utility servicing locations, zoning regulations, and compliance conditions tied to development permits. The PIP ensures that all stakeholders, including builders, trades, and inspectors are aligned with expectations before construction begins, helping to reduce delays, prevent errors, and support safe, compliant development within city standards

SURVEY

When builders are ready to begin construction on a serviced lot, a survey crew is called to prepare the site. They do this by organizing project data, verifying control points, and calibrating equipment to make sure the stakes are precisely placed.

STAKEOUT

→ Survey Stakes mark where to dig the foundation, these stakes guide the excavator for depth and location

→ Detached garages or garage suites are typically staked at a later stage because they would likely be knocked over during initial excavation stages and this can be costly for builders to have the surveyors come back

→ Lost or moved stakes can be an issue for excavation operators

→ After excavation a safety fence is installed around the site to prevent accidents

EXCAVATION

TIME FRAME FOR EXCAVATION

Excavation typically takes 3–5 working days, depending on soil conditions, weather, site accessibility, and equipment availability. Before digging occurs, the site must be surveyed, and underground utilities must be identified.

PRE-JOB INSPECTIONS

Several inspections and checks are needed to ensure safety and compliance. These items include:

→ Utilities located below ground

→ Site grading verification

→ Survey stake confirmation

→ Safety planning

→ Access and haul route confirmed

→ Environmental or erosion-control requirements

SULFUR TEST

A sulfur test or sulphate soil test determines the concentration of sulphates in the ground. High sulfate soils can chemically attack standard concrete over time, leading to deterioration and cracking.

SOIL BEARING TEST

These tests determine whether the ground can safely support the weight of the structure above it. Proper evaluation helps prevent future settlement, cracking, and structural movement.

Common Issues:

→ Soft or loose soil

→ Excess moisture

→ Organic material in the ground

→ Clay movement and expansion

→ Poor compaction from previous site activity

Potential Solutions:

→ Removing and replacing unsuitable soil

→ Increasing footing sizes

→ Adding engineered fill material

→ Soil compaction using heavy equipment

→ Deep foundation systems in extreme cases

EXCAVATION SAFETY PRECAUTIONS

Excavation work presents significant safety risks due to cave-ins, equipment movement, and underground hazards. Common safety measures include;

→ Maintaining approximately 4 feet of working room around foundation areas,

→ Installing temporary fencing or safety barriers,

→ Safe equipment access and exclusion zones,

→ Daily trench inspections,

→ Shoring techniques using steel plates or hydraulic systems may be used to prevent soil collapse in some cases.

INNOVATIONS IN EXCAVATION

→ GPS-enabled excavation equipment for precision grading

→ Hydrovac services for safer utility exposure

→ Use of recycled fill materials and erosion-control mats

MATH OF MOVING DIRT

Excavation quantities are typically measures in cubic meters or yards. Estimating soil volumes is important to ensure equipment is planned, trucking requirements are met, disposal costs are considered, backfill calculations are considered, and project scheduling is kept on track.

FLOODING

Managing water is one of the most important parts of excavation. Heavy rain, snow melt, or high groundwater levels can flood excavation sites, delay construction, destabilize soil, or increase safety risks for operators. Temporary drainage systems, pumps, and grading controls are often used to keep excavation areas dry. Builders also monitor weather forecasts closely during excavation activities.

WATER & SEWER INVERTS

An invert refers to the elevation of the inside bottom of a sewer or water pipe. Proper invert elevations are critical because underground services rely heavily on gravity flow. Incorrect invert elevations can create drainage failures, backups, or costly rework later.

COMMUNITY AND EXTERNAL FACTORS

→ Noise bylaws and dust control in residential areas

→ Seasonal access issues and frost depths

→ Coordination with developers, municipalities, and neighbours to minimize disruptions

FOOTING AND FOUNDATION

TIME FRAME

Foundations are typically poured within 1 week after excavation is complete. Cure time for the concrete adds 1–2 weeks depending on weather.

EXTERIOR FOUNDATION INSULATION

Exterior foundation insulation helps reduce heat loss and improves the energy efficiency of the home. In colder climates like Alberta, exterior insulation also helps minimize frost penetration and protects the concrete from temperature swings that can contribute to cracking over time.

WATER PROOFING

Water proofing protects the home from ground water intrusion; it is one of the most important steps in preventing basement leaks and overall building deterioration.

Damp Proofing Methods:

→ Tar Spray: Common, low-cost sealant, considered moisture resistant instead of waterproof.

→ Dimple Wrap: Premium moisture barrier installed over damp proofing layer. The dimples create air gaps that help direct water downward towards the drainage system and protect from pressure and damage during backfill.

Drainage Systems:

→ Weeping tile: Perforated pipe installed beside footing to collect groundwater.

→ Drain Rock: Clean gravel surrounding weeping tile that improves water flow.

→ Sump Pit: A collection basin where water gathers.

→ Sump Pump: Pumps collected water away from the house toward storm drains.

CONCRETE TYPES

→ Cast-in-Place Concrete: Traditional poured concrete foundations are formed and poured directly on-site. This method offers flexibility for customer layouts and is still the most common residential foundation system.

→ Rebar: Reinforcing steel (rebar) is installed inside concrete to increase tensile strength and reduce cracking. Concrete is strong under compression but weaker under tension, so steel reinforcement helps the structure resist movement and soil pressure.

- → V-Rods: Bent reinforcement bars commonly placed at corners and wall intersections to strengthen critical stress points. Proper placement and spacing of rebar are essential to meet engineering and building code requirements.
- → ICF (Insulated Concrete Forms): ICF foundations use interlocking foam blocks that are filled with reinforced concrete. The foam remains in place permanently and acts as insulation. This contributes to higher energy efficiency, improved soundproofing, faster installation, and increased strength and durability.
- → Precast Foundation: These walls are manufactured off-site in a controlled plant and delivered to the project ready for installation. This helps with faster installation, consistent quality, reduced weather delays, and potentially factory-installed insulation.

CONCRETE STRENGTH

While the standard concrete strength for most residential construction is 25–30 MPa, 32 MPa is preferred in Edmonton in many cases as it is highly sulphate resistant, something needed to combat soil conditions. Additives like air entrainment improve freeze-thaw resistance in Edmonton's climate and water reducers help with cold weather pours.

CONCRETE FOOTINGS & WALLS

Footings distribute the building load evenly in the soil, while foundation walls support the structure above and retain surrounding earth. Typical residential foot and wall dimensions include:

CRIBBING

Refers to the temporary structural supports used during excavation or foundation work to stabilize soil or support loads safely. Wood or engineered support systems may be installed to prevent trench collapse and protect workers during deep excavation activities.

COORDINATION CHALLENGES

- → Poor handoff between excavation and foundation crews can cause delays
- → Incorrect elevations or missing engineering sign-offs often hold up the pour
- → Inspectors and surveyors must be aligned on timelines
- → Weather related delays

ATCO/EPCOR CABLE TIE-INS

Utility coordination begins during the foundation stage. ATCO Energy Systems, and EPCOR services may require conduit placement, grounding preparation, or utility sleeves before backfilling occurs. Missing utilities rough-ins during this phase can create expensive rework later in the build.

BACKFILLING

This occurs after the concrete has cured and waterproofing/drainage systems are complete. Soil is packed and compacted around the foundation walls to restore grade levels. Proper backfilling is important to ensure there isn't excessive pressure on foundation walls, poorly compressed soil that will contribute to further house settlement, and to ensure water is directed away from the home.

FRAMING / LOCK-UP

TIME FRAME & LOCK-UP

The framing stage is where the house begins to take shape above the foundation. Structural components are assembled to create floors, walls, and roof systems of the building. Once the roof, windows and exterior doors are installed the home reaches “lock-up stage. This means the structure is protected from weather and can be secured, allowing interior work to begin. This phase typically takes 2-3 weeks depending on the weather, crew size, and design complexity.

FRAMING COMPONENTS

The framing package includes the structural skeleton of the home, like:

→ Walls, floor joists, and subfloors

→ Roof trusses, beams, and posts

→ Stair systems

→ Rough openings

→ Exterior sheathing

ACQ PREFAB

ACQ (Alkaline Copper Quaternary) treated wood is used to resist rot and pests, essential for base plates and outdoor framing. Prefab wall and truss systems speed up timelines and reduce framing errors.

DOORS, WINDOWS & SIDING

Rough Openings: Framed openings for windows and doors must match manufacturer specifications exactly. Incorrect sizing can cause installation delays and require expensive reframing.

Windows & Doors: Selections can affect energy efficiency, ventilation, natural lighting, appearance, and long-term costs.

→ Dual-Pane Windows: Two layers of glass with insulating gas between them.

→ Triple-Pane Windows: Three layers of glass that provide better insultation, noise reduction, and reduce heat loss.

Exterior Finishes: Protects the structure from weather while contributing to appearance and durability. Options commonly include stucco, hardie panel, brick, stone, and engineered wood products.

ECO-FRIENDLY CHOICES

Common sustainable options used by builders:

→ Engineered lumber with reduced waste

→ Locally sources materials

→ High-efficiency windows and doors

→ Recycled-content insultation products

→ Advances weather barriers

→ Energy-efficient roofing systems

MATERIAL SOURCING CHALLENGES

Construction material pricing and availability can fluctuate significantly. Builders often combat challenges by ordering materials early, using local suppliers, or sourcing alternative products. Common challenges are:

→ Tariffs on imported materials

→ Transportation disruptions

→ Supply chain shortages

→ Labour shortages in manufacturing

→ Seasonal demand spikes

LEAD TIMES

Many framing materials must be ordered well in advance to arrive on time. Ensuring lead times are considered helps prevent a backlog of work and keep the project on schedule.

THEFT & DAMAGE

Materials on-site are vulnerable to theft and damage, good ways to help prevent this is to use fencing, security cameras, locked storage containers, staggered delivery times, and temporary weather protection.

MECHANICAL, ELECTRICAL, AND PLUMBING

ROUGH-IN'S

A "rough-in" refers to the installation of systems before walls and ceilings are closed in.

Plumbing Rough-In:

→ Water supply lines
→ Drain and vent piping
→ Tub and shower locations
→ Basement slab drains
→ Gas lines

Electrical Rough-In:

→ Wiring
→ Electrical boxes
→ Panel installation
→ Lighting circuits
→ Smoke and CO detectors

Mechanical Rough-In:

→ Furnace installation
→ Ductwork
→ HRV systems
→ Exhaust venting
→ Gas appliance venting

RIGHTSIZING HVAC EQUIPMENT

Proper equipment sizing is critical for energy efficiency and system performance.

Undersized systems may struggle to maintain indoor temperatures during extreme weather.

HOW ELECTRICAL NEEDS HAVE CHANGED IN THE LAST 30 YEARS

Thirty years ago, 100-amp service was common. Today, many new homes are designed with 200-amp or larger service capacity to support modern energy demands and future upgrades. Residential electrical demand has increased significantly due to:

→ Larger homes
→ More appliances
→ Home offices
→ Air conditioning
→ EV charging systems
→ Smart home technology

HEAT RECOVERY VENTILATORS (HRV)

Modern homes are built much tighter for energy efficiency, which reduces natural airflow. HRVs improve indoor air quality by exchanging stale indoor air with fresh outdoor air. HRV's benefit us by improving ventilation, reducing humidity build-up, being more effective in utilizing energy, and improved indoor comfort.

HOME-RUN VS. MANIFOLD SYSTEMS

Home-Run Systems: Each plumbing fixture receives its own dedicated water line from a central manifold.

→ Advantages: More balanced water pressure, easier isolation for repairs, reduced fitting connections

→ Disadvantages: More piping required, higher upfront material cost

Manifold Systems: Multiple fixtures share branch lines connected together throughout the home.

→ Advantages: Lower material cost, simpler installation in some layouts

→ Disadvantages: More pressure fluctuations, harder troubleshooting

COMPLEXITIES OF THIS PHASE

→ HVAC requires correct ducting paths before framing closes in

→ Electrical boxes, plumbing vents, and drains must match final plans

→ Code inspections vary and must be booked in advance

→ Damage to completed work

→ Last-minute plan revisions

WHY TRADES NEED THEIR OWN TIME TO WORK IN THIS PHASE

Overlapping too many trades causes safety risks, damage to completed installation, delays from rework, and congested workspaces. Staggered scheduling and trade-specific prep meetings reduce these issues.

INSPECTIONS

Municipal inspections are required throughout the building process to ensure safety and code compliance. Although inspections may slow timelines, they provide important quality control and safety oversight for homeowners and builders.

FIELD NOTES