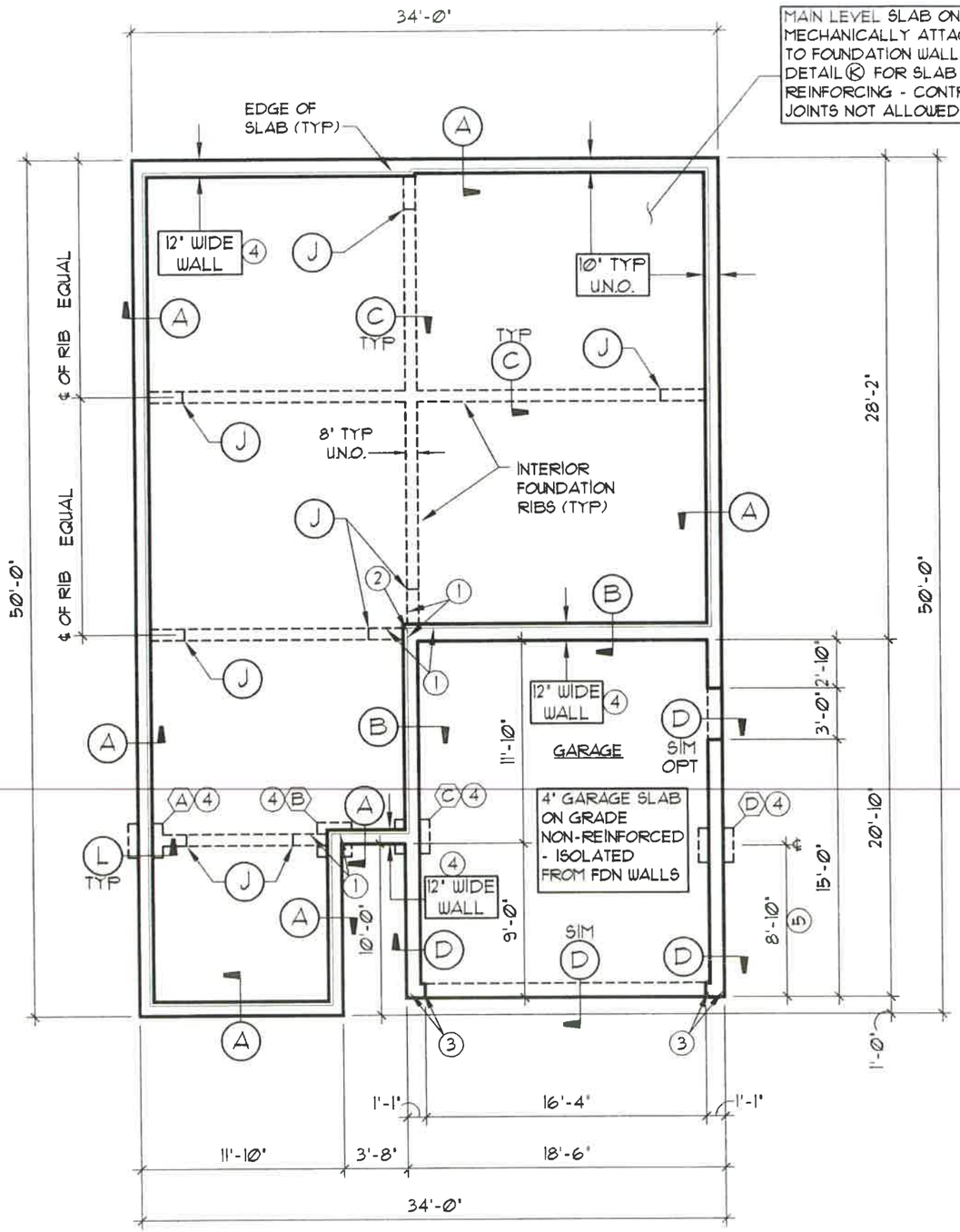
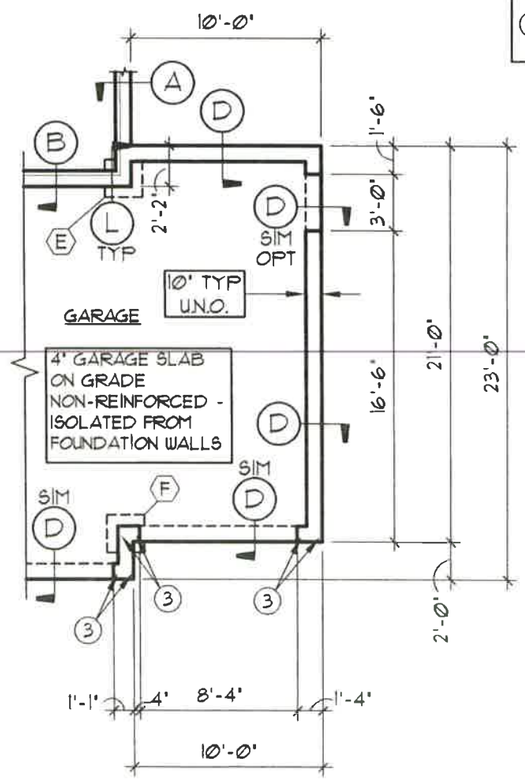


FOUNDATION PLAN

1/8" = 1'-0" ALL ELEVATIONS 2 CAR GARAGE



PARTIAL FOUNDATION PLAN W/ 3 CAR GARAGE OPTION

1/8" = 1'-0"

LEGEND

	FDN WALL SLAB LEDGE WHERE SHOWN ON PLAN
	INTERIOR RIB
(A)	SECTION OR DETAIL CALLOUT
	SHALLOW PIER
	COLUMN PAD
(1)	SEE PLAN NOTES

PLAN NOTES

1. ALIGN EDGE OF RIB WITH NOTCH IN WALL (TYP)
2. STAGGER EPOXY DOWELS FROM EACH RIB AT CORNER. MAINTAIN MIN 3" CLEAR CONCRETE EDGE DISTANCE
3. HOLDOWN PER STRUCTURAL PLANS (BY OTHERS)
4. ELEVATION 'C' ONLY
5. DIMENSION IS TO CENTERLINE OF GIRDER TRUSS G01 POST - VERIFY

PAD SCHEDULE

PAD	PAD SIZE
(A)	24" X 24"
(B)	24" X 24"
(C)	24" X 24"
(D)	24" X 24"
(E)	24" X 24"
(F)	24" X 24"

~~FOR THE FIELD LAYOUT, REFER TO THE~~ LIMITED DIMENSIONAL INFORMATION SHOWN ON THIS PLAN, ARCHITECTURAL PLANS REFERENCED IN GENERAL NOTE (b) AND FOUNDATION NOTES (c) AND (i). ROCKY MOUNTAIN GROUP SHALL BE NOTIFIED OF DIMENSIONAL CHANGES AFFECTING THIS LAYOUT. INSTALL **WALL STEPS** PER DETAILS (G) AND (H)

ALL FOUNDATION WALLS SHOWN SHALL BE POURED MONOLITHICALLY U.N.O.

VERIFY ALL DIMENSIONS PRIOR TO CONSTRUCTION

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ARCHITECTS RMG ENGINEERS
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MASTER 1264
STIFFENED SLAB FOUNDATION
EL PASO COUNTY, COLORADO
CHALLENGER COLORADO, LLC

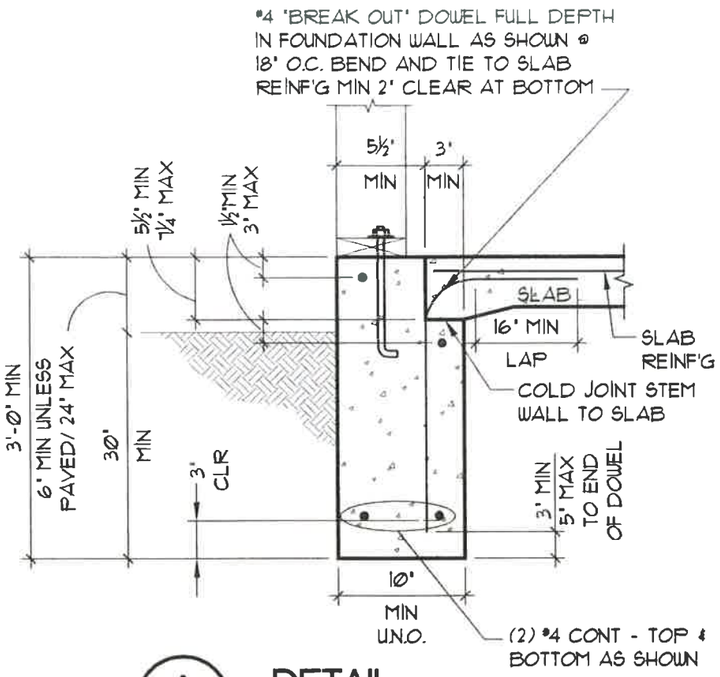
ARCH/ENG:	AV
DRAWN:	CL
CHECKED:	CAS
DATE	11-30-2017

#	REVISION	DATE

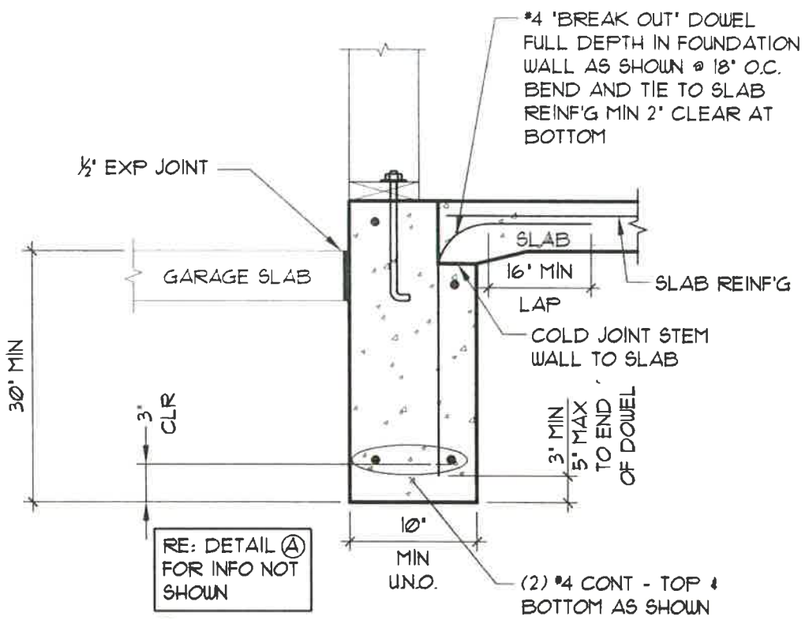
JOB NO. 161216

SHEET NAME: FOUNDATION PLAN & PAD SCHEDULE

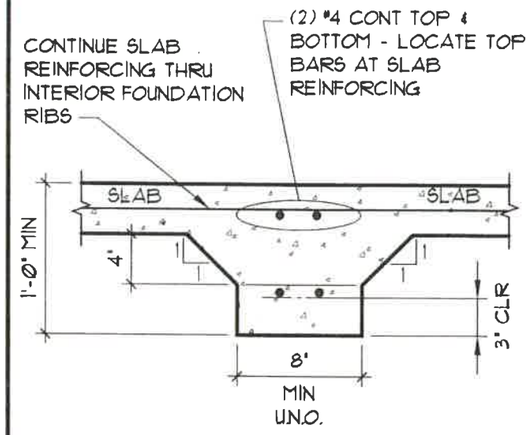
SHEET NO. F1 of 4



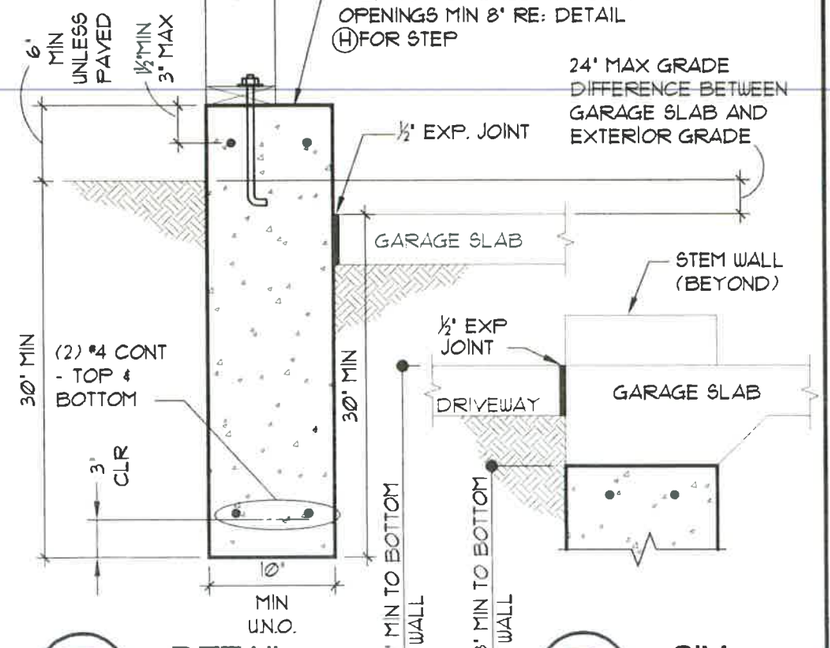
A DETAIL N.T.S.



B DETAIL N.T.S.

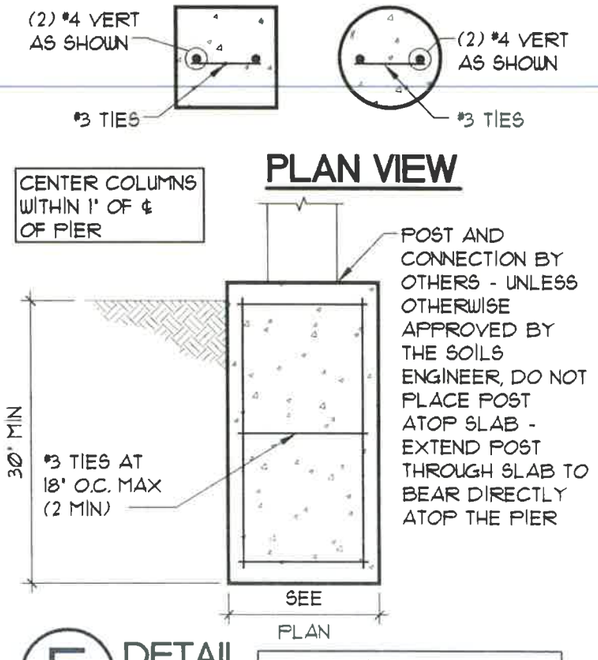


C DETAIL N.T.S.



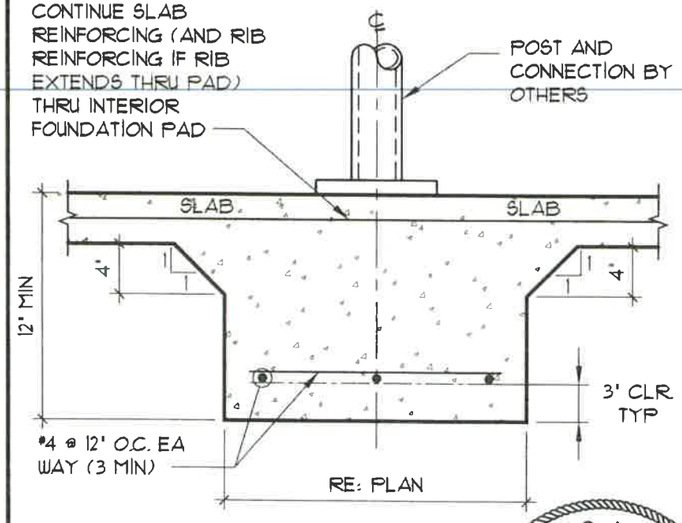
D DETAIL N.T.S.

D SIM. N.T.S.



E DETAIL N.T.S.

LOCATE PIER ON NATURAL, UNDISTURBED SOIL OR ON APPROVED STRUCTURAL FILL



F DETAIL N.T.S.

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MASTER 1264
STIFFENED SLAB FOUNDATION
EL PASO COUNTY, COLORADO

CHALLENGER COLORADO, LLC

ARCH/ENG:	AV
DRAWN:	CL
CHECKED:	CAS
DATE	11-30-2017

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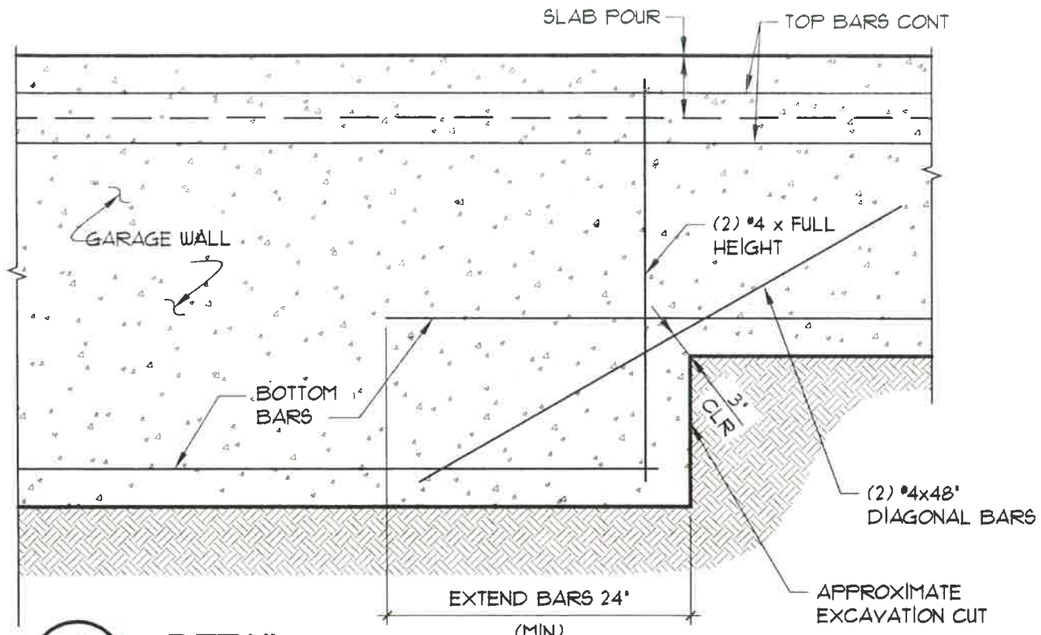
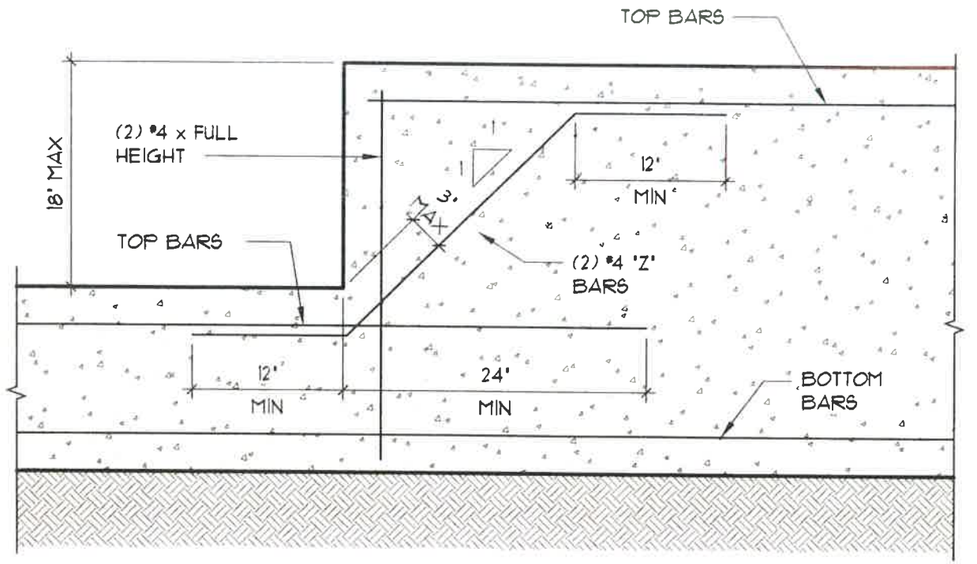
JOB NO. 161216

SHEET NAME: DETAILS

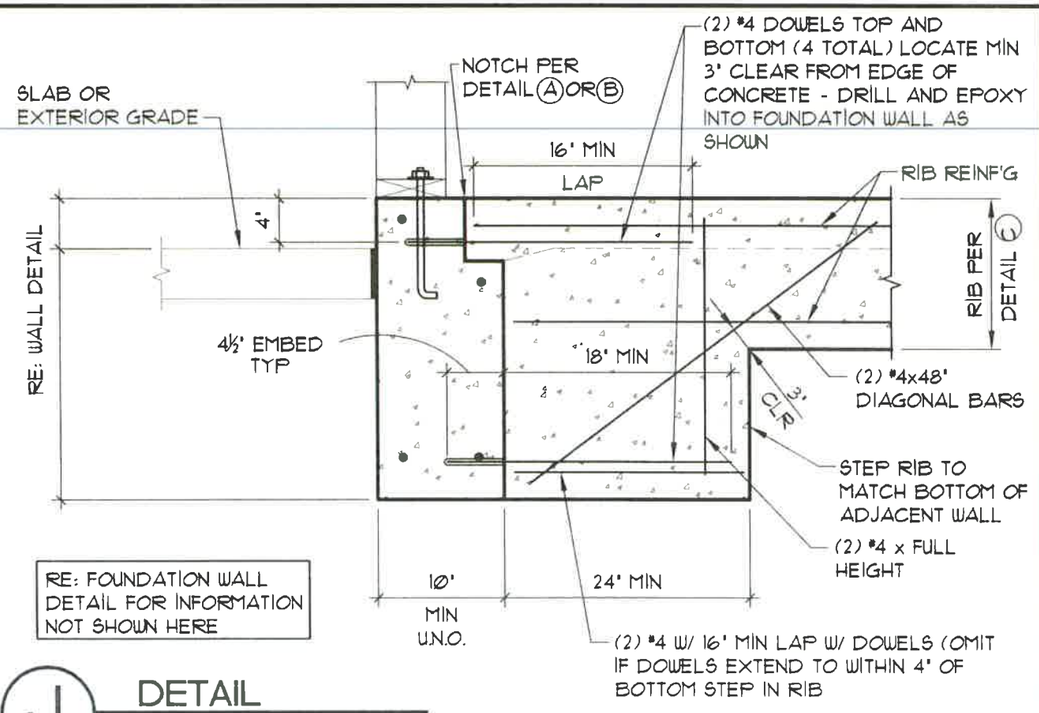
SHEET NO. F2 of 4



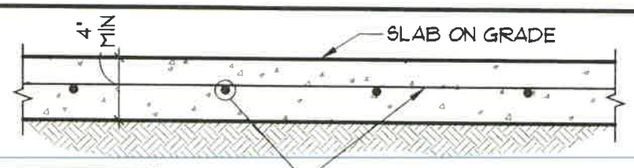
G DETAIL
N.T.S.



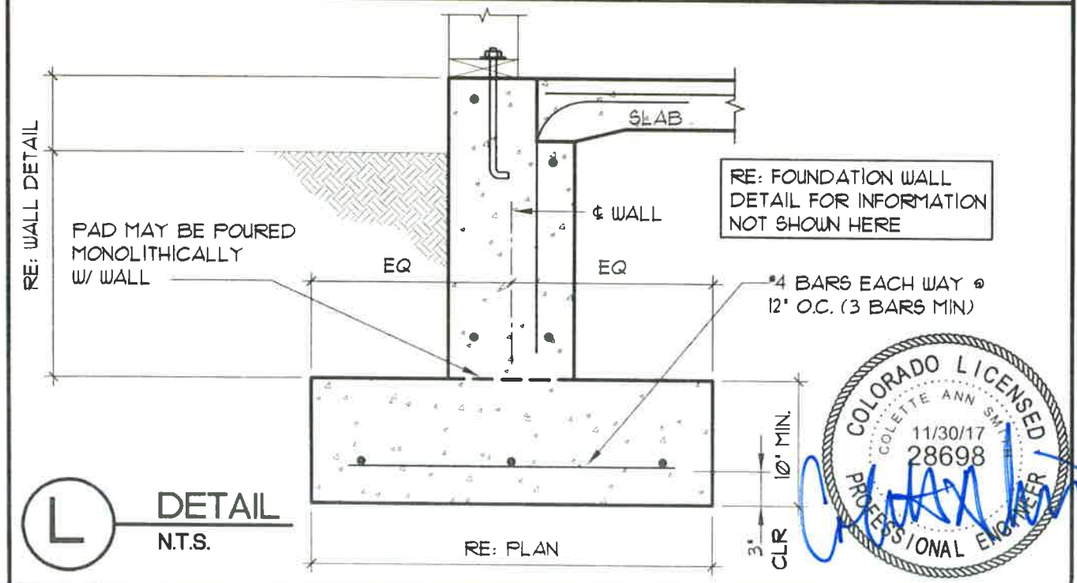
H DETAIL
N.T.S.



J DETAIL
N.T.S.



K DETAIL
N.T.S.



L DETAIL
N.T.S.

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MASTER 1264
STIFFENED SLAB FOUNDATION
EL PASO COUNTY, COLORADO
CHALLENGER COLORADO, LLC

ARCH/ENG:	AV
DRAWN:	CL
CHECKED:	CAS
DATE	11-30-2017

#	REVISION	DATE

JOB NO. 161216
SHEET NAME: DETAILS
SHEET NO. F3 of 4

STRUCTURAL GENERAL NOTES

CODES:

Design is based on, and all construction shall comply with, the 2009 International Residential Code (IRC) / 2011 Pikes Peak Regional Building Code / ASCE 32-01

GENERAL:

A. Foundation design is void two years after original date of issue or date of most recent "update" revision. Plan must be updated to acceptable codes and practices at that time.

B. DO NOT SCALE. The schematic layout shown is based solely on architectural plans and other written documentation by **Challenger Homes, Inc.** of **Master Plan 1264**, last dated **8-30-17**. Any changes to the schematic layout must be specific and clearly conveyed to **Rocky Mountain Group** in written form as a change for inclusion into these plans. CONTRACTOR AND/ OR CLIENT SHALL VERIFY ALL DIMENSIONS AND LAYOUT PRIOR TO CONSTRUCTION. Due to the nature of the residential design process, Rocky Mountain Group shall not be held responsible for dimensional and layout discrepancies if this verification is not completed and/ or if Rocky Mountain Group is not notified immediately upon discovery of such discrepancies.

DESIGN LOADS:

Roof Load	(Dead Load) . . . . 15 psf	Floor Load	(Dead Load) . . . . . 10 psf
Snow	(Live Load) . . . . . 40 psf		(Live Load). . . . . .40 psf
Deck Load	(Dead Load). . . . 15 psf	Soil Parameters (EFP).	40 pcf (Nonexpansive Backfill)
	(Live Load) . . . . .40 psf	P1	20 max
		Cw	22.5

FOUNDATION:

A. This design has been completed in accordance with pertinent standards, recommended design soil parameters and accepted engineering design procedures, and is based on the best information available at the time of completion. The design is intended to minimize differential movement resulting from the heaving or settling of subsurface soils. It must be recognized that foundation components will undergo movement. Client and owners shall appraise any subsequent owners of the soil conditions noted in the soils report for the specific site and advise them to maintain good practices in the future with regard to surface and subsurface drainage, framing of partitions above floor slabs, drywall and finish work above the floor slabs, etc. THIS "RESIDENTIAL STYLE" FOUNDATION PLAN IS INTENDED TO BE USED WITH THE REFERENCED ARCHITECTURAL/ STRUCTURAL PLAN FOR SITE EXCAVATION AND FOUNDATION CONSTRUCTION.

B. foundation design is based on a minimum allowable soil bearing capacity of 2000 psf with no minimum dead load requirement.

C. An Open Excavation Observation by a licensed colorado engineer is required prior to construction to verify these soil parameters and to confirm the suitability of a "stiffened slab" type foundation. Compaction testing by a licensed colorado engineer is required prior to placing the slab reinforcement to verify that fill placed below interior (non-garage) slabs is consistent with these soil design parameters. Refer to the Open Excavation observation report for all requirements and specifications pertaining to the placement of structural fill.

D. This stiffened slab design is based on the publication "Design of Slab on Grade Foundations" procedure developed by Walter C. Snowden, RE. updated March, 1996. The design incorporates the weighted plasticity index (P1) and climate rating (CW) listed above.

E. Specific location of wall and slab steps by others unless noted on this plan.

F. Mechanically compact all interior and exterior backfill per Geotechnical Engineer. Avoid inducing construction loads along foundation walls in excess of lateral design loads shown above. Use non-expansive exterior backfill along foundation walls U.N.O.

G. Slope backfill away from the building a minimum of 10% for the first 10 feet. Paved areas may slope at 2%. Carry roof drains across the backfilled areas with a surface outlet. Do not allow water to stand or pond near the building. Do not flood the backfill. Planters, if any, shall be well sealed and drained. Irrigation devices shall be kept a minimum of 5 feet from all foundations.

H. The use of drywells on this site is not recommended.

I. Preparation of subgrade for interior ribs and floor slabs per Geotechnical Engineer.

J. All foundation piers or pads shall be formed to proper dimensions as indicated on the drawings. Center of column or wall shall be located within 4" of the center of the pad.

K. The location of foundation jogs, wall and slab steps and top of wall elevations and connections are critical to foundation performance. These items are frequently not shown on "residential style" plans and are not within the scope of this design, (unless noted otherwise,) as they typically change during the actual residential construction. As a result this design can not address proper foundation configuration unless stated specifically on the drawings.

L. DO NOT extend plumbing through ribs - plumbing may be extended under ribs in middle third of rib span only. DO NOT locate plumbing parallel to ribs either directly below the ribs or lower than the ribs within a horizontal distance equal to the height of the ribs.

CONCRETE:

A. Detail reinforcement in accordance with ACI 315-99, Detailing Manual.

Minimum concrete cover for reinforcement shall be as follows:

Concrete cast against earth . . . . . 3"

Formed concrete exposed to earth or weather . . . . . 1 1/2"

Interior slabs, walls . . . . . 3/4"

B. Minimum recommended compressive design strength of concrete used for foundations shall be 4000 psi.

C. Reinforcing steel shall conform to ASTM A615, grade 60 except #3 bars may be Grade 40.

D. Longitudinal reinforcing in walls and footings shall be continuous at corners and intersections. Matching corner bars shall be used. Minimum lap of reinforcing shall be 30 bar diameters. Do not weld splices unless approved by ROCKY MOUNTAIN GROUP.

E. All concrete operations, including but not limited to mix design, mixing, transporting, placing, reinforcing detailing and placing, curing and testing shall be done in accordance with the requirements and application of ACI 301-05. "Specifications for Structural Concrete."

F. The contractor is responsible for determining when it is safe to remove forms and/or shoring. Forms and shoring must not be removed until the walls are strong enough to carry their own weight and any anticipated superimposed loads. For foundation walls, this typically requires at least 12 hours of cumulative curing time at a temperature of 50^F or more. Concrete must be adequately covered during cold periods to maintain this surface temperature. Due to varying weather conditions, alternative curing processes, and the use of Type II cement, Rocky Mountain Group suggests forms remain in place a **minimum of 3 days** to assure this performance specification has been met. When forms are stripped there must be no excessive deflection or distortion or discoloration and no evidence of damage to the concrete. Adequate thermal protection of the concrete shall after stripping for a cumulative period of 48 hours at 50^F, or more, after the initial pour. See foundation notes for continued specifications on when to backfill foundation walls.

G. Type I/II cement shall be used.

H. Anchor bolts per 2009 IRC unless otherwise noted. (Minimum 1/2"~ anchor bolt with a minimum embedment of 8" spaced at 6 feet o.c. and a maximum of 12" from end of any mudsill)

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MASTER 1264
STIFFENED SLAB FOUNDATION
EL PASO COUNTY, COLORADO

CHALLENGER COLORADO, LLC

ARCH/ENG:	AV
DRAWN:	CL
CHECKED:	CAS
DATE	11-30-2017

#	REVISION	DATE

JOB NO. 161216

SHEET NAME: GENERAL NOTES

SHEET NO. F4 of 4

Job No. 163011

June 7, 2018

Challenger Colorado, LLC
8605 Explorer Drive, Suite 250
Colorado Springs CO 80920

Re: Stiffened Slab Observation
11401 Moonrock Heights
Blk 4, Lot 1, Courtyards at Woodmen Hills West
El Paso County, Colorado

Gentlemen:

At your request, personnel of RMG - Rocky Mountain Group observed the placement of the reinforcing for the "stiffened slab" style foundation system. In addition we observed the placement of the concrete encased electrode. These observations were performed at the address referenced above on May 9, 23, 24 and 31, 2018.

The reinforcing was found to be placed in general accordance with the foundation design by RMG last dated November 30, 2017, Job No. 161216. The concrete encased electrode was found to be in general accordance with Article 250.50 of the 2005 National Electrical Code.

Should you have questions, please do not hesitate to call.

Cordially,

RMG – Rocky Mountain Group

Tony Munger, P.E.
Geotechnical Project Manager

FIELD DENSITY REPORT

Client: Challenger Colorado, LLC
8605 Explorer Drive, Suite 250
Colorado Springs, CO 80920

Job No.: 163011
Project: 11401 Moonrock Heights
Blk 4, Lot 1, Courtyards at Woodmen Hills West
El Paso County, Colorado

Moisture-Density Test Information		Laboratory Test Data			Project Specifications	
Sample No.	Classification and Description	Test Method	Maximum Dry Density (pcf)	Optimum Water Content (%)	Water Content Range (%)	
1	SM	ASTM D-1557	119.3	6.5	NA	NA

Field Test Results

Date(s) Tested: May 23 and 24, 2018										
Technician(s): Phillip Oates										
Test No.	Location	Test Type[1]	Test Depth (ft)	Elevation Datum[2]	Dry Density (pcf)	Water Content (%)	Moisture Density Sample No.	Percent Compaction (%)	Minimum Percent Compaction (%)	Test Pass
1	5'N & 7'E from SW corner of foundation	ST	1.5	C	112.5	4.0	1	94	92	Y
2	10'S & 4'W from NE corner of foundation	ST	1.5	C	114.2	4.1	1	96	92	Y
3	6'N & 6'E from SW corner of foundation	ST	0	C	111.9	4.2	1	94	92	Y
4	11'S & 5'W from NE corner of foundation	ST	0	C	113.5	4.0	1	95	92	Y

[1] Test Type Key
UT – Utility Trench Backfill
EB – Exterior Backfill
IB – Interior Backfill
ST – Structural Fill
SG – Subgrade

[2] Elevation Datum Key
A – Existing Ground Surface
B – Top Back of Curb
C –Pavement/Slab Elevation
D – Top of Pipe
E – Foundation/Footing Grade
F – Finished Grade Surface

COLORADO REGISTERED ANTHONY P. MUNGER 6/20/18 39818 PROFESSIONAL ENGINEER

Tony Munger, P.E.

These tests were conducted on a periodic, "on-call" basis, meaning that a limited portion of the fill operation was observed and tested by Rocky Mountain Group (RMG). The test results may not be representative of all fill placed. In all cases, contractors shall retain the responsibility for the quality of their work, for adhering to plans and specifications, and for repairing defects regardless of when they are discovered.

Job No. 163011

April 27, 2018

Challenger Colorado, LLC
8605 Explorer Drive, Suite 250
Colorado Springs, CO 80920

Re: Open Excavation Observation
11401 Moonrock Heights
Blk 4, Lot 1, Courtyards at Woodmen Hills West
El Paso County, Colorado

Dear Challenger Colorado, LLC:

RMG – Rocky Mountain Group has observed the foundation excavation at the above referenced address on April 26, 2018. Our findings, conclusions and recommendations are provided in this report. RMG should be made aware of subsequent changes to the excavation.

Subsurface Soil Investigation: A Subsurface Soil Investigation was performed which included the referenced site. Results can be seen in the report by RMG, Job No. 162387. The homeowners should carefully familiarize themselves with the information in the report that may affect residential construction. Additionally, the homeowners should carefully familiarize themselves with the information contained in the attached Appendix A.

Subsurface Materials: 0' – 6': Fill: Silty sand.

Expansion Potential: Low.

Moisture Conditions: Moist.

Maximum Allowable Bearing Pressure: 2,000 psf.

Minimum Dead Load Pressure: None.

Equivalent Fluid Pressure (EFP): 40 pcf. See **Lateral Earth Pressures** section.

Fill:

Overlot grading fill was exposed in the excavation. We understand this fill was observed and tested during placement by others. The excavation did not penetrate the fill.

Foundation Recommendations:

A stiffened slab-on-grade foundation is suitable for the proposed structure. The foundation should conform to the master foundation plan for Challenger Homes of model 1264 by RMG, Job No. 161216, last dated November 30, 2017. A maximum allowable bearing pressure of 2,000 psf may be used for design. A total movement of 1 inch with a differential movement of ½ inch of a horizontal distance of 10 feet has been estimated. The foundation design should be prepared by a qualified Colorado Registered Professional Engineer using the recommendations presented in this report. The bottoms of exterior grade beams should be at least 30 inches below finished grade for frost protection.

Perimeter Drain:

A subsurface perimeter drain will not be required around the foundation.

Open Hole Observation:

The recommendations provided in this report are based on the conditions exposed in the excavation at the time of our observation and information contained in the Subsurface Soil Investigation referenced above. These recommendations are based on accepted local engineering practice and are intended for individuals familiar with local construction practices and standards. If exposure to the elements results in a change to these conditions at any point prior to foundation construction and/or backfilling the foundation, we recommend that RMG be contacted to re-evaluate the excavation to determine suitability of the recommendations contained herein.

All previous recommendations included in the Subsurface Soil Investigation referenced above and not specifically addressed herein remain valid.

Should you have questions, please do not hesitate to call.

Cordially,

RMG – Rocky Mountain Group

Tony Munger, P.E.
Geotechnical Project Manager

Appendix A – Supplementary Information

Interior Floor Slabs:

For interior floor slabs not comprising an integral component of the stiffened slab-on-grade foundation system and isolated from the foundation wall (such as garage floors), vertical slab movements on the order one to three inches have been estimated for the subsurface conditions encountered. If movement and associated damage to floors and finishes cannot be tolerated, a structural floor system should be used. Isolated floor slabs should be separated from structural components to allow for vertical movement.

Exterior Floor Slabs:

Recommendations for exterior concrete slabs such as patios, driveways and sidewalks are not included in this report.

Interior Partitions:

Interior non bearing partitions and other attached finishes do not require isolation from floor slabs that comprise a stiffened slab foundation system.

Lateral Earth Pressures:

Foundation and basement walls should be designed to resist lateral pressures. The Equivalent Fluid Pressure (EFP) previously presented applies to non-expansive backfill materials and level, drained backfill conditions. EFPs for sloping/undrained conditions should be determined on an individual basis. Expansive soils or bedrock should not be used as backfill against foundation and basement walls.

Surface Grading and Drainage:

The ground surface should be sloped away from the building with a minimum gradient of 10 percent for the first 10 feet. This is equivalent to 12 inches of fall across this 10-foot zone. If a 10-foot zone is not possible on the upslope side of the structure, then a well-defined swale should be created a minimum of 5 feet from the foundation and sloped parallel with the wall at a minimum slope of 2 percent to intercept the surface water and transport it around and away from the structure. Roof drains should extend across backfill zones and landscaped areas. Homeowners should maintain the surface grading and drainage recommended in this report to help prevent water from being directed toward and/or ponding near the foundations.

Landscaping should be selected to reduce irrigation requirements. Plants used close to foundation walls should be limited to those with low moisture requirements, and irrigated grass should not be located within 5 feet of the foundation.

Irrigation devices should not be placed within 5 feet of the foundation. Irrigation should be limited to the amount sufficient to maintain vegetation. Application of more water will increase the likelihood of slab and foundation movements.

Subsurface Drainage Recommendations:

Subsurface drainage recommendations made in the attached Open Excavation Observation report shall be installed per the typical drain details included in this Appendix.

It must be understood that a subsurface drains are designed to intercept some types of subsurface moisture and not others. Therefore, the drains could operate properly and not mitigate all moisture problems relating to foundation performance or moisture intrusion into the basement area.

Concrete:

Type I/II cement is recommended for concrete in contact with the subsurface materials. Calcium chloride should be used with caution for soils with high sulfate contents. The concrete should not be placed on frozen ground. If placed during periods of cold temperatures, the concrete should be kept from freezing. This may require covering the concrete with insulated blankets and heating. Concrete work should be completed in accordance with the latest applicable guidelines and standards published by ACI.

Exterior Backfill:

Backfill should be placed in loose lifts not exceeding 8 to 12 inches, moisture conditioned to facilitate compaction (usually within 2 percent of the optimum moisture content) and compacted to 85 percent of the maximum dry density as determined by the Modified Proctor test, ASTM D-1557 on exterior sides of walls in landscaped areas. In areas where backfill supports pavement and/or concrete flatwork, the materials should be compacted to 92 percent of the maximum dry density.

Fill placed on slopes should be benched into the slope. Maximum bench heights should not exceed 4 feet, and bench widths should be wide enough to accommodate compaction equipment.

The appropriate government/utility specifications should be used for fill placed in utility trenches. If material is imported for backfill, the material should be approved by the Geotechnical Engineer prior to hauling it to the site.

The backfill should not be placed on frozen subgrade or allowed to freeze during moisture conditioning and placement. Backfill should be compacted by mechanical means, and foundation walls should be braced during backfilling and compaction.

Structural Fill:

Areas to receive structural fill should have topsoil, organic material, or debris removed. The upper 6 inches of the exposed surface soils should be scarified and moisture conditioned to facilitate compaction (usually within 2 percent of the optimum moisture content) and compacted to a minimum of 92 percent of the maximum dry density as determined by the Modified Proctor test (ASTM D-1557), or 95 percent of the maximum dry density as determined by the Standard Proctor test (ASTM D-698), prior to placing structural fill.

Structural fill placed on slopes should be benched into the slope. Maximum bench heights should not exceed 4 feet, and bench widths should be wide enough to accommodate compaction equipment.

Structural fill should be placed in loose lifts not exceeding 8 to 12 inches, moisture conditioned to facilitate compaction (usually within 2 percent of the optimum moisture content) and compacted to a minimum of 92 percent of the maximum dry density as determined by the

Modified Proctor test (ASTM D-1557). The materials should be compacted by mechanical means.

Materials used for structural fill should be approved by RMG prior to use. Structural fill should not be placed on frozen subgrade or allowed to freeze during moisture conditioning and placement.

To verify the condition of the compacted soils, density tests should be performed during placement. The first density tests should be conducted when 24 inches of fill have been placed.

Foundation Configuration Remarks:

The configuration of the foundation system is critical to its performance. The position of foundation windows, jogs, steps and the relative elevation of adjacent and opposite walls can affect foundation performance. The nature of residential foundation construction does not allow for control of these conditions by the Foundation Design Engineer. Improper placement of the above can result in differential and lateral foundation movement not anticipated by the Geotechnical Engineer. The Foundation Design Engineer should be contacted regarding the foundation configuration.

General Remarks:

The recommendations provided in this report are based upon the observed soil conditions, anticipated foundation loads, and accepted engineering procedures. The recommendations are intended to reduce differential movement. *It must be recognized that the foundations will undergo some movement on all soil types*. In addition, concrete floor slabs will likely move vertically, therefore, the recommendations regarding isolation of floor slabs from columns, walls, partitions or other structural components should be implemented to reduce potential damage to the superstructure. Subsequent owners should be apprised of the soil conditions and advised to maintain good practice in the future with regard to surface and subsurface drainage, partition framing, drywall and finish work above floor slabs.

Senate Bill 13:

This report may be partial fulfillment of Colorado Senate Bill 13 (1984), C.R.S. 6-6.5-101, if the purchaser receives this report at least fourteen days prior to closing. The purchaser is strongly urged to read this section of this report on Senate Bill 13 with care and consideration.

One of the purposes of Senate Bill 13 is to inform the purchaser of the presence of expansive soil or hazards on the site. Geologic and environmental hazards are outside the scope of services of this report. If the Expansion Potential paragraph on page one or two reports low to moderate, moderate or high, then expansive soil is present on the site. Expansive soil and bedrock will result in movement of foundation components and floor slabs. The effect of swelling soils is reduced but not eliminated by the recommendations contained in this report.

The homeowner and builder should review and become familiar with Special Publication 43 issued by the Colorado Geologic Survey.

This soil report and recommendations contained herein are only valid if all parts of Senate Bill 13 are satisfied.