

# BRECKENRIDGE SKI & RACQUET CLUB RESTORATION

CONCRETE REPAIR AT HIGH ALTITUDE



# BRECKENRIDGE, COLORADO

- AVERAGE 300" OF SNOW FALL YEARLY
- HIGHEST RECORDED TEMP 89°F IN 1939
- LOWEST RECORDED TEMP -46°F IN 1924
- AVERAGE WINTER TEMP -6°F TO 38°F
- MAXIMUM AVERAGE PRECIPITATION OCCURS IN AUGUST
- SNOW STARTS IN SEPTEMBER AND ENDS IN LATE APRIL YEARLY.





# SKI & RACQUET CLUB



- 3 – 4 STORY CONDOMINIUM BUILDINGS HOLDING 72 - 1, 2, & 3 BEDROOM UNITS
- BUILT IN 1972, 1973, AND 1974
- PRECAST TRIPLE “T” CONCRETE CONSTRUCTION 13’-8” WIDE X 12” LEGS X 2” FLANGES. NO CONCRETE TOPPING SLAB.
- TEES CANTILEVER 5’-0” AT REAR BALCONIES AND 6’-0” AT THE FRONT ENTRY WAYS
- TYPICAL BALCONIES – 35’-0 X 5’-0”
- FRONT WALK – 256’-0” X 6’-0”
- CONSTRUCTION COMPONENTS – CONCRETE IN-FILL WALL PANELS WITH WOOD RAILINGS AND WOOD STAIR ENCLOSURES.
- 4’ DEAD AIR SPACE FOUNDATION CRAWL SPACE DRILLED PIERS 4’-0” O.C.



# WHERE DID WE START AND HOW DID WE FINISHED





# PROJECT TIME LINE

- 2007 S&R BOARD DEVELOPED PROPOSAL TO INSTALL NEW “FACE LIFT” - AKA BUILDING ENVELOPE
- 2007 LOCAL ARCHITECT DISCOVERS CONCRETE REPAIR ISSUES
- 2008 LOCAL ENGINEER SURVEY OF CONCRETE
- 2009 REPAIR SPEC BID - \$300,000
- 2009 ENVELOP PROJECT BID – \$1,800,000
- 2009 PROJECT PUT ON HOLD DUE TO FUNDING
- 2011 PROJECT REVISITED BY HOA
- 2011 STRUCTURAL CONSULTANTS INC. BROUGHT IN TO REVISIT THE CONCRETE ISSUES.
- CONCRETE DAMAGE CONSIDERABLY LARGER THAN 2009 – ESTIMATES \$550 TO \$600K
- JULY 2011 PROJECT GREEN **LIGHT** BY HOA
- REDUCED ENVELOPE “ARCHITECTURE” AND ENHANCED CONCRETE REPAIR AND PROTECTION DESIGN.

# CONCRETE REVIEW - APRIL 2012

## 2 Types of Flange Deterioration



Concrete Spall



Concrete about to spall

# CONCRETE REVIEW - APRIL 2012









# CONCRETE REVIEW - APRIL 2012 PREVIOUS REPAIRS



# CONCRETE REVIEW - APRIL 2012

50% of the rear balconies were repaired in 2009



Not coated

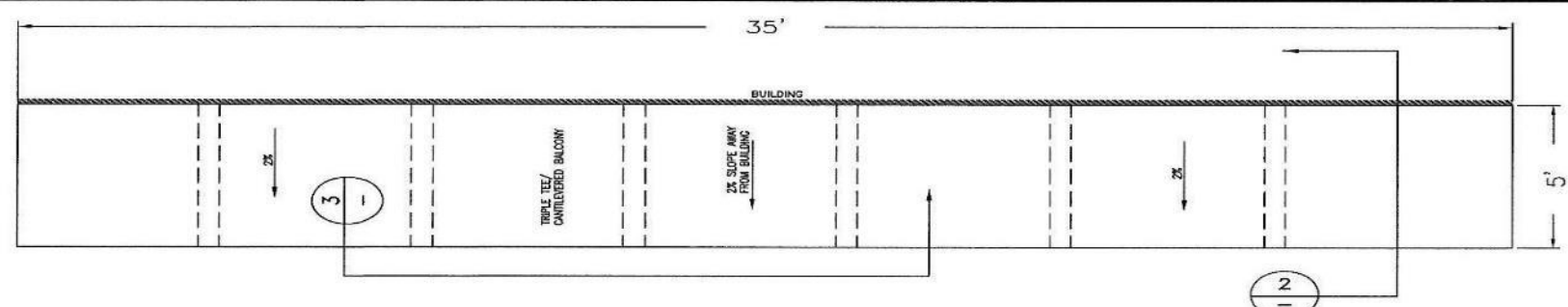


Cementitious coating

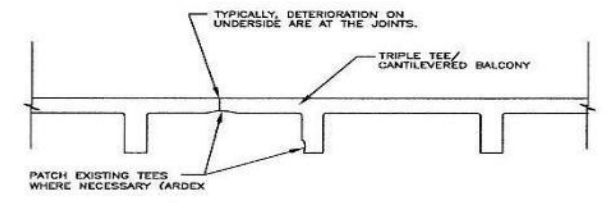




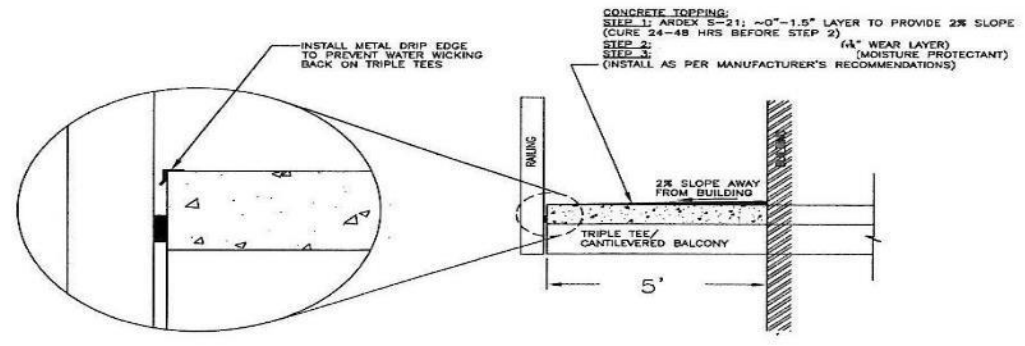
# DESIGN FOR CONCRETE BALCONY AND WALKWAYS



1-1  
TYPICAL BALCONY - PLAN VIEW  
SCALE : NTS



3-3  
TYPICAL FRONT VIEW OF BALCONY/TEES  
SCALE : NTS



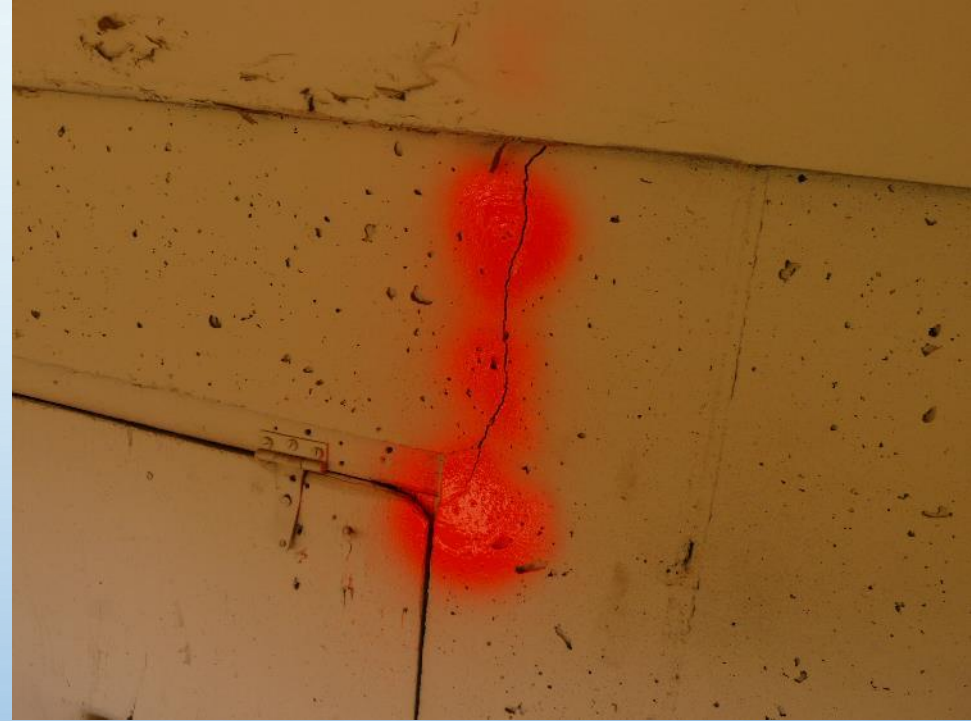
2-2  
TYPICAL BALCONY/TEE - SECTION  
SCALE : NTS

Order of Priority	Access this Unit for Balcony Drainage Work (top side of triple tees)	Access this unit to Patch horiz/vert surfaces of triple tees (underneath side of triple tees)
1	P1 B	201B
2	P2 B	202B
3	?	G1B
4	P5 B	205 B
5	P6 B	206 B
6	P2 A	202 A
7	?	G8 C
8	P1 C	201C
9	P2 C	202 C
10	P5 C	205 C

SKI AND RACQUET CLUB CONDOS  
BALCONY DRAINAGE IMPROVEMENTS  
BRECKENRIDGE, COLORADO

Project No.:	NA
Scale:	
Date:	08/29/07
Design:	SPS
Drawn:	SPS
Check:	
Revisions:	

# FOUNDATION REPAIR





# WHEN GOOD PLANS GO WRONG

- TOWN OF BRECKENRIDGE REVIEWED PLANS AND SPECIFICATIONS.....
- AND REVIEWED
- AND REVIEWED

- TOWN DETERMINED THE FOLLOWING

- OWNER/OCCUPIERS ONLY COULD LIVE IN UNITS DURING CONSTRUCTION
- TOWN DETERMINED THEY HAD NO EXPERTS IN CONCRETE REPAIR
- GRANTED BUILDING PERMIT<sup>S</sup> STARTING MAY 1, 2012 AND ENDING OCTOBER 15, 2012

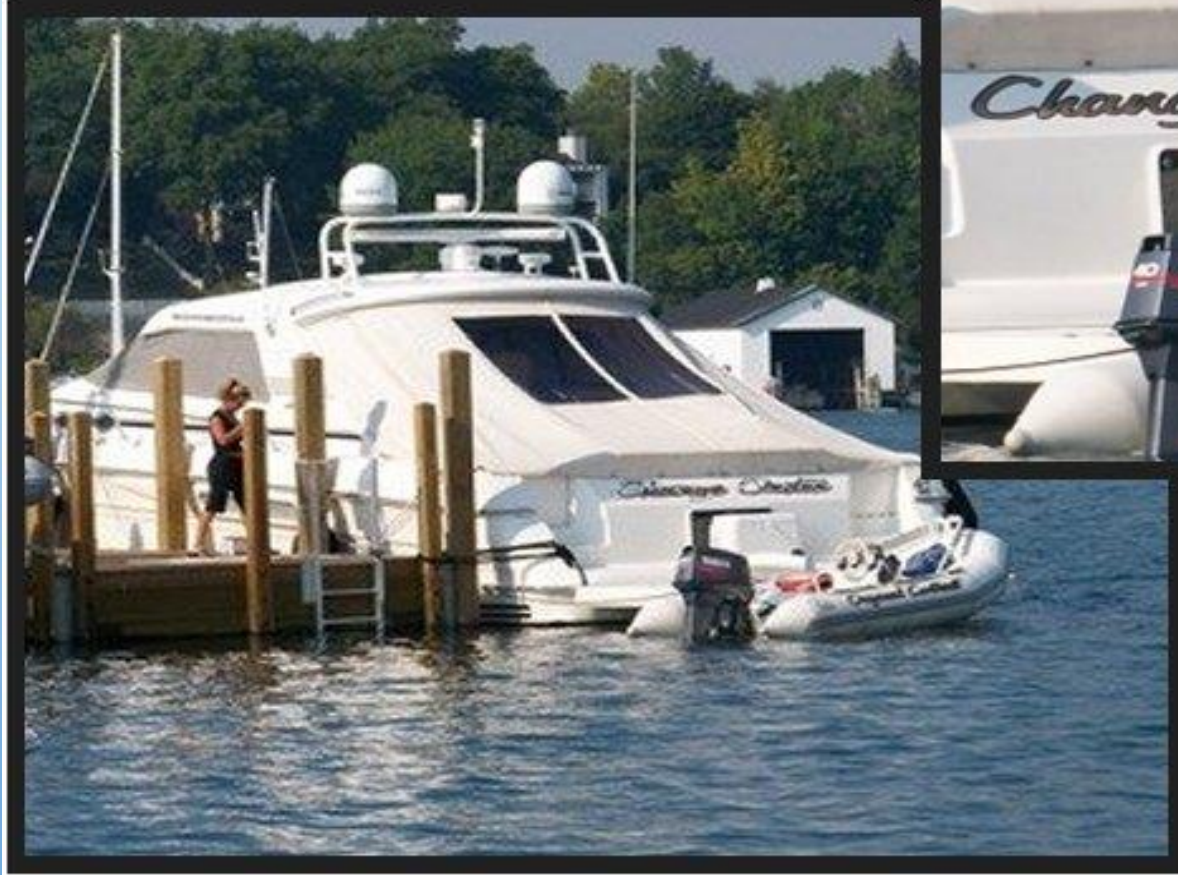


# SPALLS - DETERIORATION WORSE THAN EXPECTED





# GOOD CONTRACTORS AND GOOD WORKING RELATIONSHIPS PREVENT.....





# DECK SPALLS COMPLETED - TIME TO CREATE POSITIVE DRAINAGE



Overlay prep – ICRI surface profile chips used as reference.





# NEW RAILING SYSTEM REQUIRED NEW CONNECTIONS TO THE T ENDS.



New railings required a 6"x12" header to accommodate the 6"x6" railing posts.





# DECK COATING INSTALLATION





# DECK COATING INSTALLATION



# CLUB HOUSE DECK COATING





# DECK COATING – FEBRUARY 2014





# ENERGY SAVING INITIATIVES



New energy efficient windows installed



New energy efficient doors installed



Upgraded insulation and building wrap



# WRAP UP

- PROJECT STARTED MAY 1, 2012
- PROJECT COMPLETED OCTOBER 15, 2012
- PROJECT TOTAL: \$2,200,000
- CONCRETE REPAIR: \$625,000
- MINIMAL DISRUPTION TO OWNERS  
**ALLOWING THEM TO STAY DURING**  
CONSTRUCTION.

## • CONSTRUCTION TEAM

